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FIRST LISTEN

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THE BIG PICTURE

Pioneer Projector
ProScan 35-Inch TV



SEPTEMBER 1995 USA \$2.95 CANADA \$3.95

I
was
passing through a wasteland when suddenly my mind drifted



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my spirit lifted, my location shifted into
a
new
dimension

a
third
dimension

a
good
dimension.

Was this their intention?
To crash my dimension?

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MAGAZINE



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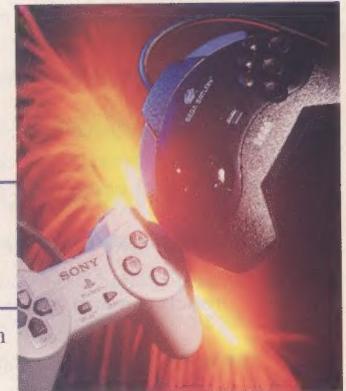
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Sony's first DSS package tested

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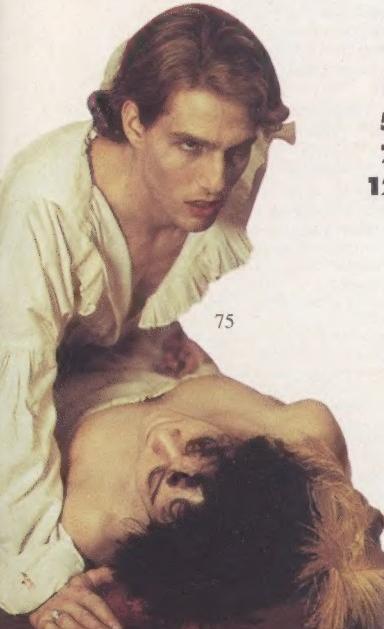
Dolby Surround AC-3 digital surround sound
lives up to all of the hype

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ON THE COVER Sony's SAS-AD1 (page 24)

COVER PHOTO Tony Cordoza



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Down to Earth

■ TV FROM OUTER SPACE. I'VE ALWAYS LIKED THE

ring of that—has an *X Files* kind of vibe to it.

Apparently, I'm not alone. Though it didn't make

Nightline, history of the consumer-electronics kind

has been made: Sometime this fall, the one millionth Digital Satellite System

(DSS) dish will be planted on someone's roof or lawn. Need a point of reference? About 30,000 compact disc players were sold in the year following

that format's debut. ■ DSS—recently bolstered by new packages from Sony

(see our exclusive test of their top gun, beginning on page 24)—certainly has

a lot going for it. The handy dish wouldn't look out of place holding a

family-style portion of pasta on your dining room table. You only need to

reach out and make a call to hook up with the programmers. Dozens of

pay-per-view options put an end to video-shop late fees. Incredible sports

packages let you pick the game you want to see, whether you're following

da Bulls, da Bears, or da Bruins. And on-screen menus make surfing

the wide DSS sea a breeze. ■ The fine print: By law, DSS can't broadcast

local channels in most areas, so cable or a standard TV antenna usually is a

necessity. Programming may drop out when a nasty storm assaults

your home. And, as Ken Pohlmann explains in his first "Digital Reality"

column (page 18), the MPEG coding that's used to squeeze all of DSS's

digital channels into the available bandwidth can introduce picture artifacts.

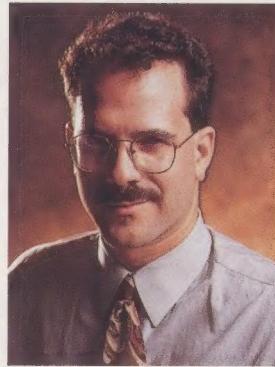
■ DSS programmers are actively seeking solutions to these problems;

advances in MPEG coding have already netted marked improvements in

picture quality. In fact, current "MPEG-1½" pictures are generally

on par with the sound we were getting from compact discs back in 1983,

one year after that format's debut. And look where the CD is today. ■



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BILL WOLFE

Editor-in-Chief

Executive Editor MARC HOROWITZ

Technical Editor LANCELOT BRAITHWAITE

Senior Editors PETER BARRY

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Art Director LAURA SUTCLIFFE

Managing Editor MIKE METTLER

Associate Editors JOSEF KREBS

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Assistant Art Director GARY FRENCH

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Database Manager JOSÉ L. GARCIA

Contributors Stewart Applegath, Michael Desmond, M. Faust, Paul Gluckman, Pete Hisey, Ken Korman, Daniel Kumin, Timothy Liebe, Tom Miller, Kevin Miller, Mel Neuhaus, Tom Nousaine, Ken C. Pohlmann, Cliff Roth, Andy Wickstrom, James K. Wilcox

TONY CATALANO

Vice President and Group Publisher

CONSUMER ELECTRONICS GROUP ADVERTISING

Publisher, VIDEO: Jay Rosenfield
212.767.6062

VP and Associate Publisher:

Scott Constantine 212.767.6346

Regional VP/Ad Director, East Coast:

Charles L.P. Watson 212.767.6038

Regional Account Manager, East Coast:

Christine B. Forhez 212.767.6025

Account Executive:

Penry Price 212.767.6077

Midwest Advertising Manager:

Jerry Stoeckigt 312.923.4804

Regional VP/Ad Director, West Coast:

Bob Meth 213.954.4831

West Coast Advertising Manager:

Paula Mayeri 213.954.4830

West Coast Sales Assistant: Nikki Parker

Assistant to the Publisher: Aline J. Pulley

Operations Manager: Sylvia Correa

Advertising Coordinator: Adele Ferraioli

Sales Assistant: Yvonne Telesford

National Record-Label Sales Representatives:

The Mitchell Advertising Group (MAG Inc.)

Mitch Herskowitz 212.490.1715

Steve Gross 212.490.1895

Production Director: Patti Burns

Production Manager: Gary M. Krystofak

General Manager: Greg Roperti

Business Manager: Christine Z. Maillet

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Startling research suggests that many jazz aficionados own a TV.



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Lynnfield VR

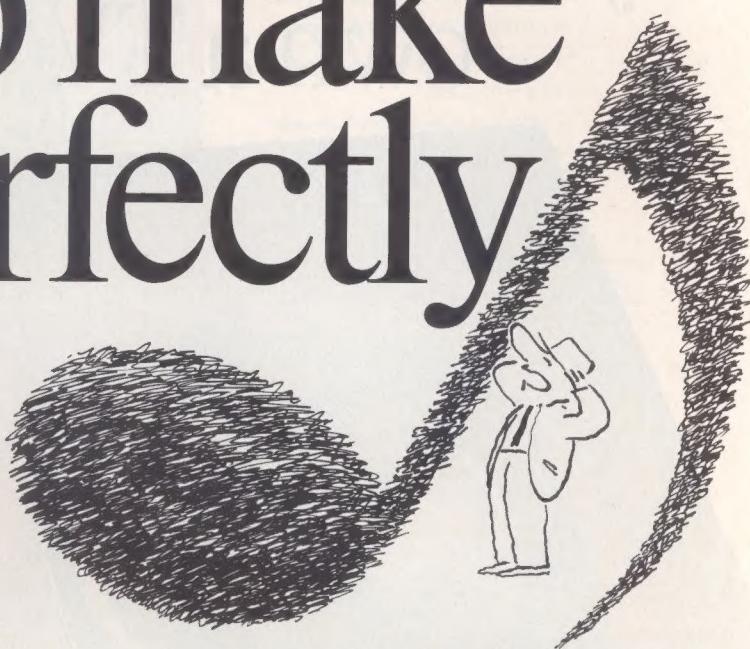


This Lynnfield VR home theater includes two shielded VR40 speakers, a VR12 center channel speaker, a VR500 subwoofer and VRS dipole surrounds.

Boston Acoustics

70 Broadway, Lynnfield, MA 01940 617-592-9000

Adcom would like to make this perfectly clear.



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—Lewis Lipnick, *Stereophile*, Vol. 11 No. 4, April 1988.

Recommended accessory in *Stereophile*, Vol. 12 No. 4, April 1989.

Line Protection: It Pays For Itself

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—Ken Pohlman, *AUDIO*, November 1987.

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KANE GANG

I read "Citizen Kane" [June 1995] with interest, having just spent a substantial amount of time assessing current large-screen sets, including the ProScan version of IDTV, which uses a doubled scan rate. Scan lines and other defects can be quite distracting with large screens, as Joe Kane notes, and neither IDTV nor rear-projection displays seemed good enough to pursue several years ago. But progress has been made. I find that I like the current IDTV rear-projection picture—enough to finally vote for it with my purchasing dollars.

Michael D. Zuteck
Kemah, TX

In your interview with Joe Kane, he said that the screen of a rear-projection TV should always be replaced for better performance. I'm entertaining the possibility of upgrading the screen of my RCA P52152ST 52-incher; to whom should I talk? Are there any certified techs in my area? Do I need to get the TV recalibrated if I replace its screen?

Paul Keisler
Clemson, SC
PKeis8956@aol.com

Call 407.997.9073 for the name of a local Kane-trained tech. Da-Lite (219.267.8101) manufactures replacement screens; depending on the screen being replaced, the TV may require recalibration. —Ed.

GLASS HOUSES

I enjoyed your June issue, and I'm pleased that you've kept the perspective of the Imaging Science Foundation [ISF] in your TV reviews. This was apparent in "Glass Act" [July/August 1995], too. From the quotes of some of the TV manufacturers' executives, I can see that videophiles who desire a TV that correctly and accurately follows all of the NTSC standards are going to have a very difficult time of it.

Rob Egan
Califon, NJ
robe@pixels.att.com

As a TV-calibration specialist trained by the ISF, I'd like to comment on the statements made by several TV makers in "Glass Act." If whites look pink, it's probably the result of a careless calibration; if anything, D6500 [a picture that's calibrated to the NTSC standard of 6,500 degrees Kelvin and appropriate footlambert figures] will display a white field with a light buttery quality. Claims that D6500 produces pictures that are too warm and look good only in dark rooms are not true in my experience; though there may be a slight loss in absolute brightness as measured in footlamberts, my customers feel that color information previously buried in excessive blues comes alive. As for claims that D6500 doesn't appeal to most consumers, my direct experience again indicates otherwise, provided that the video source material is of high quality: D6500 is simply going to be less tolerant of MPEG-1, mass-duplicated VHS software, and carelessly constructed, maintained, and operated cable systems.

Louis A. Carliner
Perfect Vision Tuneup
Rockville, MD

Most consumers use VHS and/or cable as their primary source(s). —Ed.

DISH-APPOINTED

I was one of the first in my area to buy a DSS package. The promise of digital audio was fulfilled: The stereo sound is, for the most part, great. But I've been disappointed by the frequent and *extremely* annoying digital artifacts in the picture. It seems that MPEG video compression/decompression can't "keep up" when there's a rapid picture change. And I think you've underplayed the extent of the

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**PICKS & PANS**

Readers had mixed opinions of the redesign that debuted in our June 1995 issue. Bruce F. Field, of Rockville, Maryland, disliked the "emphasis on audio," while David E. Casperson, of Adoka, Minnesota, said that "there should have been 10 to 15 reviews of video products." Richard McCleary, of Jacksonville, Florida, asked us to "cut down on the hardware and expand the program listings." On the other hand, Jay Friedman, commenting online from kfriedman@desire.wright.edu, said, "Congratulations on the new format—the layout and features are great!" And Bob Gould, at 70263.504@compuserve.com, added, "I think the magazine is much improved, with much better coverage of audio subjects complementing the good video equipment coverage."

problem—a beautiful still picture with an occasional awful moving picture isn't an acceptable compromise in my book. What does this problem portend for the future quality of video in general? Will digital VCRs suffer the same problems? Will digital videodiscs? Digital video from the phone companies? I'm sincerely concerned that the industry is taking a step backward in picture quality.

Douglas Dobbins
Mauldin, SC

I've been a confirmed audio/video-phile for years, so you can imagine my delight when DSS came on the scene. I initially was ecstatic with the video and audio quality—as good as laserdisc to my eyes and ears. Rain and snow cause minor short-term signal loss (but not nearly as bad as cable), which sometimes gets screwed

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DC Suburbs: Audio Buys.

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Valdosta Stereo Festival: Atlanta• Stereo Shop: Martinez.

HI- Audio Center: Honolulu.

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ID- Good Ear: Boise• Wise Buy: Idaho Falls.

IL- United Audio Centers: Chicago & Suburbs• Camera Corner: Bloomington• Cars & Stereos: Rockford• Jon's Home Center: Quincy• Sound Forum: Crystal Lake• Select Sound: Naperville• Sundown A/V: Springfield.

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KS- Accent Sound: Overland Park• Advance Audio: Wichita• Audio Junction: Junction City.

KY- Ovation Audio: Lexington, Louisville.

LA- Alterman Audio: New Orleans, Metairie, Covington• Sound Advice: Baton Rouge• Wright's Sound Gallery: Shreveport.

MA- Cookin': Saugus• Goodwines Audio: Boston, Shrewsbury• Nantucket Sound: Hyannis.

MD- Audio Buys: Annapolis, Gaithersburg, Laurel, Rockville, Waldorf• Gramophone: Balt., Ellicott City• Soundscape: Baltimore.

ME- Cookin': Portland Sound Source: Bangor.

MI- Pecar's: Detroit• Troy Classical Jazz Holland• Classic Stereo: Kalamazoo, Grand Rapids• Front Row A/V: Flint• Future Sound: Ypsilanti• Court St. Listening Room: Midland, Saginaw.

MN- Audio Designs: Winona• Audio King: Minneapolis & Suburbs, Rochester, St. Cloud• Audio Perfection: Minneapolis.

MO- Independence A/V: Indep. Sound Central: St Louis.

MS- McLellan TV: Hattiesburg• Players A/V: Ridgeland.

MT- Car & Home Stereo Center: Billings• Rocky Mountain Hi-Fi: Great Falls.

NC- Audio Video Systems: Charlotte• Audio Visions: Wilmington• Now Audio Video: Durham, Greensboro, Raleigh, Winston-Salem• Audio Lab: Wilmington• Tri City Elect.: Conover.

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NJ- Hal's Stereo: Trenton• Monmouth Stereo: Shrewsbury, Wall• Sound Waves: Northfield• Woodbridge Stereo: West Caldwell, Woodbridge.

NM- Ultimate Elect.: Albuquerque• Sound Ideas: Albuquerque.

NY- Ultimate Elect.: Las Vegas• Upper Ear: Las Vegas.

NY- Audio Breakthroughs: Manhattan• Audio Den: Lake Grove• Audio Expressions: Newburgh• Audio Junction: Watertown• Clark Music: Albany, Syracuse• Stereo Exchange: Manhattan, Nanuet• Hart Elect.: Vestal• Innovative Audio: Brooklyn• Listening Room: Scarsdale• Rowe Camera: Rochester• Sound Mill: Mt. Kisco, Yorktown Hts. • Speaker Shop: Amherst, Buffalo• Stellar Stereo: Ithaca, OK- Contemporary Sds: Ok City• K Labs Premium Audio: Tulsa.

OH- Audio Craft: Akron, Cleveland, Mayfield Hts., Westlake• Audio Etc.: Dayton, Paragon Sound: Toledo.

OR- Bradford's HiFi: Eugene• Chelsea AV: Portland, Beaverton• Kelly's Home Ctr.: Salem• Larson's: Medford, Roseburg• Stereo Plant: Bend.

PA- Gary's Elect.: State College• GNT Stereo: Lancaster• Hart Elect.: Blakely, Kingston• Hi Fi House: Abington, Broome• Listening Post: Pittsburgh• Palmer Audio: Allentown• Stereoland: Natrona Heights.

RJ- Stereo Discount Center: Providence.

SC- A/V Design: Charleston• Upstairs Audio: Columbia.

SD- Audio King: Sioux Falls.

TN- College HiFi: Chattanooga• Hi Fi Buys: Nashville• Now Audio Video: Knoxville• Modern Music: Memphis• New Wave Elect.: Jackson• Sound Room: Johnson City.

TX- Home Entertainment: Dallas, Houston• Audio Tech: Temple, Waco• Audio Video: College Station, Brock A/V: Beaumont• Bunkley's Sd. Systems: Abilene• Bjorn's: San Antonio• High Fidelity: Austin• Krystal Clear: Dallas• Marvin Electronics: Ft. Worth• Sd. Box: San Angelo• Sd. Quest: El Paso• Sd. Systems: Amarillo• Sd. Towne: Texarkana.

UT- Alpine Elect.: Provo• AudioWorks: Salt Lake City• Crazy Bob's: St. George• Stokes Bros.: Logan• Ultimate Elect.: Layton, Murray, Orem, Salt Lake City.

VA- Audio Buys: Arlington, Fairfax, Falls Church, Manassas• Audio Connection: Virginia Beach• Audiotronics: Roanoke• Home Media Store: Richmond• Stereo Type: Charlottesville.

VT- Audio Video Authority: S. Burlington.

WA- Definitive Audio: Bellevue, Seattle• Evergreen Audio: Silverdale• Pacific St. & Sd.: Wenatchee• Tin Ear Kennewick.

WV- Sound Post: Princeton.

WI- Audio Emporium: Milwaukee• Absolute Sound & Vision: Sheboygan• Sound World: Wausau.

Puerto Rico- Precision Audio: Rio Piedras.

Canada- A & B Sound: Calgary, Edmonton, Kelowna, Vancouver & Suburbs, Victoria• Advance Electronics: Winnipeg• Bay Bloor Radio: Toronto• Centre Audio Charest: Trois Rivières• CORA: Quebec City• Digital Dynamics: Clearbrook• Great West Audio: London• Lipton's: New Market Ontario• Peak Audio: Halifax• Sd. Room: Vancouver StereoLand: Windsor• Treble Clef: Ottawa.

Mexico- Contact Grupo Volumen: Mexico City.

up for days), and I used to get some interference on some channels (which turned out to be caused by the proximity of my microwave oven to my dish!). In the last few months, though, I've noticed a substantial degradation of the picture quality on DirecTV, particularly during fast-action scenes and scene-to-scene shifts. If squeezing more channels into the same spectrum at some point results in a noticeable loss in quality, I'd prefer fewer channels with high quality to more channels accompanied by noticeable degradation.

Alan Kennedy
Superior, WI

See Ken C. Pohlmann's straight-talking report on MPEG and DSS ["Bit Streams," which begins on page 18] and his review of Sony's SAS-AD1 [page 24]. As for future formats, MPEG-2 appears to be the compression scheme of choice, and picture quality will depend on the sophistication of the encoding algorithms as well as on choices made by the programmers.

—Ed.

FOCUS GROUP

I recently purchased a Sony TR700 camcorder. When I set it to AUTO and record large groups of people, the focus doesn't lock on the people—it simply sways back and forth. Will I always have to set it to manual in this scenario?

Danny Mavromatis
Kirkland, WA
Mavromatis@aol.com

Technical editor Lance Braithwaite replies: The TR700's autofocus (AF) system is very speedy, reacting quickly to what it perceives as a change in subject distance. A good solution is to focus on the closest (usually the largest) subject in the AF sweet-spot window.

THE TITTER END

Thanks for recognizing the fun that occurs after the credit sequences in some movies ["Off the Air," June 1995]. I howled at the end of *The Ad-*

ventures of Priscilla, Queen of the Desert. Now I have to go out and rent *Little Buddha*!

Thomas K. Biddle

Denver
TKusterB@aol.com

WIDESCREEN

I own a 40-inch Mitsubishi direct-view and refuse to buy any more so-called "widescreen-version" laserdisks. What is it with letterbox [LBX]? What's the attraction? What's the benefit? Annoyances and displeasure—are they admirable? I didn't buy a big-screen TV so they could take it away from me—with some LBX LDs I lose a foot of screen, and, I'm sure, some picture content.

G. Chlebda
Fairfax, VA

While the masking bars that appear on your screen do cut into overall image size, you aren't losing content. In fact, you're gaining it, since you get to see the sides of the image, which are cut off in versions that fit a conventional 4:3 screen. Widescreen discs present complete images, and the extra (original) width enables you to be enveloped by them—if you move close enough to your TV, and if doing so doesn't make your set's "line structure" an annoying displeasure. —Ed.

CORRECTIONS

In "Divide & Conquer" (July/August 1995), we incorrectly stated that laserdisks store chroma and luminance information separately; in fact, they store it as a single, composite signal.

In "Eyes on the Prize" (July/August 1995), we mistated the price of Fox-Video's *True Lies*; it's \$50.

In "SoftWire" (June 1995), we misnamed Jim Carrey's paramour in *The Mask*—his lovely co-star was Cameron Diaz, not Amy Yasbeck.

Charlie Sheen was dressed as a clown, not in drag, at the end of *The Chase* ("Off the Air," June 1995). And though he was reciting lines from *Apocalypse Now*, they were Robert Duvall's lines, not Martin Sheen's. ■

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Backdraft	*0559005
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Ghost	*0826008
Goodfellas	*0969808
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Chinatown	*0202507
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dvd watch

The digital videodisc (DVD) format war is getting fiercer every day.

- Though the first DVD players aren't due to hit A/V shops until sometime next year, both the Sony/Philips and Toshiba/Time Warner camps are talking about DVD recorders. At presstime, Sony was on the verge of announcing tentative technical specs for a recordable DVD that could debut as early as 1997. Political and economic issues have surfaced again, of course, as they do whenever a technology "threatens" to empower consumers with the ability to make digital copies of films or other programming with no loss in quality. Questions about copyright protection and royalties will probably prove more complex than the nuts and bolts of a DVD recorder's operation.

• Sony has provided a few more specifics on the play-only DVD they're developing with Philips. The MMCD (multimedia compact disc) differs from the music CD in a number of important ways: It uses MPEG-2 digital compression [see "Bit Streams," page 18], and the size and pitch of the pits read by the

player's laser are much smaller. In addition, EFM (eight-to-fourteen modulation) and error-correction coding are vastly improved, greatly increasing efficiency.

- There's no further news on the standardization front. Maneuvering by the competing camps has so far failed to yield any real movement toward the universal ideal: a single DVD standard.

—Marc Horowitz

pass the buck

As the U.S. dollar wilted against the Japanese yen in the early summer heat, most major Japan-based A/V manufacturers were studying wholesale price increases on selected video and audio-for-video components. It's been a tough 12 months for Japanese subsidiaries operating in the United States, as the dollar's spring-time plunge was estimated to have raised manufacturing costs by 20 percent since last fall.

Though price hikes may be imposed on retailers this fall, consumers may not notice much of a ripple. At presstime, for example, Sony was said to be

guided tour

Guide Plus+, an on-screen program guide, is slated to debut in TVs and VCRs early next year. Along with VideoGuide ["Fast Forward," January 1995], Guide Plus+ is a serious challenger to StarSight ["The Year's Best," January 1995].

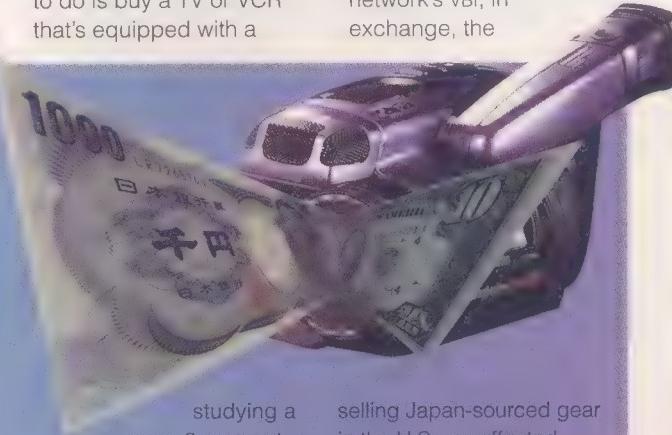
Developed by Gemstar, the company that invented the VCR Plus+ VCR-programming system, Guide Plus+ shares StarSight's basics: Both systems display program listings, complete with show summaries, on your TV via the TV signal's vertical blanking interval (VBI). But the two systems are far from identical.

The big plus for Guide Plus+ is that the service is free; to get it, all you need to do is buy a TV or VCR that's equipped with a

Guide Plus+ decoder. StarSight also requires a decoder (available built into TVs and VCRs or as a standalone box), but they charge setup and monthly subscription fees of \$15 and under \$4, respectively. Gemstar can

NOW		NEXT	
Married With Children	6:12p	Married With Children	6:00p 30m (CC)
NBC	4	News at 6	
ABC	7	Eyewitness News at 6	
CBS	2	CBS Evening News	
NBC	4	News at 6	
FOX	11	Married With Children	
PBS	28	Nightly Business ...	
KCAL	9	Inside Edition	
KCOP	13	Cosby Show	
KSCI	18	News	

afford to offer their service free thanks to an innovative arrangement with the ABC TV network: Guide Plus+ data will be carried on the network's VBI; in exchange, the



studying a mere 2-percent price increase on some VCRs, camcorders, and audio components. Many manufacturers report that they'll make up the difference in areas invisible to consumers, such as cutbacks in funds paid to dealers for local advertising.

The slowing U.S. economy may actually help: While all manufacturers

selling Japan-sourced gear in the U.S. are affected, most are reluctant to raise prices drastically because they don't want to plant an obstacle in front of buyers. Pioneer, which was considering price increases of up to 3 percent in June, now say they probably won't raise prices at all on TVs and other high-volume components.

—Paul Gluckman

THE NUMBER

4

Number of video heads in JVC's upcoming D-VHS bit-stream recorder.

network and its affiliates receive preferential positioning on the guide's display.

StarSight's advantage is that their listings are far more comprehensive than Guide Plus+. They provide a week's worth of information, while Guide Plus+ is generally confined to 2-day blocks. StarSight's grid guide also

displays up to three time slots simultaneously, while Guide Plus+ presents only a single slot. In addition, StarSight gives viewers more ways to customize the displays, and their displays are easier on your eyes.

Guide Plus+ does offer one thing that the current incarnation of StarSight doesn't, however: A unique "live" video window (similar to a PIP) of the currently tuned channel is fully integrated into the listings.

Gemstar says they have licensing agreements with most major TV and VCR manufacturers. Expect Hitachi, JVC, Magnavox, and Panasonic to be the first to offer the guide.

—Marjorie Costello



tape talk

JVC and RCA may have made a splash by introducing the D-VHS format this summer ["Feedback," June 1995], but that hasn't slowed work on the digital videocassette (DVC) format. A tweaked version of the format's specs, which were first approved by more than 50 manufacturers over a year ago ["Fast Forward," July 1994], was recently approved as HDTV-compatible by an FCC

work group. Meanwhile, Sony and Thomson predict that the first DVC camcorders for consumers could hit A/V shops roughly one year from now; pricing may be about \$2,000.

The format, which isn't backward-compatible with the VHS format, accommodates two different cassettes, each using 6-mm (0.25-inch) metal tape. The larger cassette measures 4.9 x 3 x 0.6 inches (h/w/d) and records 4.5 hours of standard-definition (SD)

high time

Viewers excited by the prospect of high-definition television (HDTV) had a good-news/bad-news summer. RCA and Zenith promised that HDTV sets would be available in 1997, while the parent NBC network has committed to broadcasting at least some HDTV programming by then. The embattled FCC also completed final testing of the digital HDTV format, clearing the way for its official approval next spring. But arguments over what to do with the HDTV standard's "second channel," and concerns voiced by local broadcast affiliates, still hover like thunderheads.

The second channel in question was originally intended to carry an HDTV channel plus conventional (analog) NTSC

programming. But the same bandwidth could carry as many as four digital NTSC channels. Most local affiliates prefer four standard-resolution channels, since a conventional TV set could receive them with the addition of a compatible digital-decoding black box (HDTV channels can only be received and displayed by HDTV sets).

This concerns most local affiliates, since the high cost of early-generation HDTV sets—expected to be a minimum of about

\$5,000 for a rear-projection set, and, perhaps, about \$3,500 for a 32-inch direct-view set—will mean that relatively few people will be able to afford to watch HDTV channels. Broadcasters can't collect advertising dollars if they don't have viewers, and many affiliates say they need ad dollars to offset the cost of upgrading their facilities for HDTV (which can easily run into millions of dollars).

The FCC—whose powers are being assailed by deregulation-

minded legislators in Washington—has hinted that it'll let broadcasters make their own choices regarding the second channel. This might not be a terrible compromise, as long as some HDTV channels get on the air. After all, do we really need to see news, sitcoms, talk shows, and home shopping in high-def?

Broadcasters know that they need to get moving, though. The DSS and Primestar satellite systems are already ahead of them on the technology curve, the cable industry is busy working on digital cable service, and the telephone companies are tweaking compression algorithms in an attempt to squeeze multiple channels of programming with high-quality pictures and sound through conventional phone lines. —Bill Wolfe



video with 500 lines of horizontal resolution or 2.25 hours of high-definition (HD) video. The smaller cassette, which is intended for use in DVC camcorders, measures 2.6 x 1.9 x 0.48 inches (h/w/d) and holds 1 hour of SD or 0.5 hour of HD video.

Unlike D-VHS decks, DVC components will incorporate analog-to-digital and digital-to-analog converters, so you'll be able to connect a DVC component directly to conventional audio/video sources and TV sets; a D-VHS-style digital-bit-stream input and output are also part of the spec.

—Rob Sabin

plasma attack

Engineers have wanted to build flat TV sets that you could hang on a wall since the 1930s. Liquid-crystal displays (LCDs) generally have been their medium of choice, and the technology has progressed to the point where it's given us thin, flat TVs—but the biggest production model only has a 20-inch screen size. Plasma displays, in which a hot and glowing gas-like mass of charged particles is manipulated by the video signal, have also shown promise, though prototypes have come up short on brightness and contrast and have

generated excessive heat. It was something of a surprise, therefore, when Mitsubishi announced that they'll introduce a flat, 40-inch plasma TV within 12 months.

The company claims to have solved the brightness and contrast problems, though they're still working on a way to satisfactorily dissipate heat. The 40-incher will be extremely expensive at first, and it could take several years for it to come as low as even \$5,000.

Just don't hold your breath for screens larger than 40 inches or with the resolution required for high definition: Current plasma technology allows high contrast and brightness or high resolution, but not both. Initially, executives at Mitsubishi say, we'll have to settle for "state-of-the-art NTSC performance."

—Lance Braithwaite

mouse party

Disney is the latest media company to jump into interactive TV. The company recently announced that it'll join three Baby Bells—Ameritech, BellSouth, and SBC (parent of Southwestern Bell)—in Media Ventures, Inc.

Under the agreement, Disney will provide programming and

bright spots

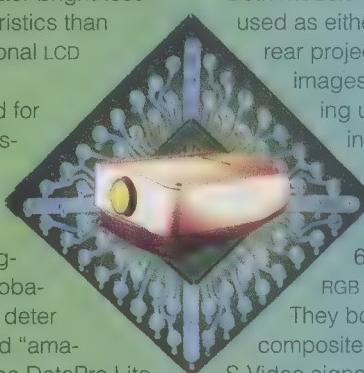
Panasonic has begun selling two projectors that incorporate an innovative liquid-crystal-display (LCD) technology that the company says offers better brightness characteristics than conventional LCD models.

Designed for the professional market (though that designation probably won't deter dedicated "amateurs"), the DataPro Lite III (PT-L390U, \$8,500) is rated at a very bright 350 ANSI lumens, while its sibling, the DataPro Lite II (PT-L290U, price not available) is said to deliver 200 ANSI lumens. Their brightness is attributed to a 1.3-inch

poly/silicon layer that was added to the thin-film-transistor (TFT) LCD panel. This layer gives each pixel its own aperture, allowing more light to pass through.

Both models can be used as either front or rear projectors, with images measuring up to 300 inches in diagonal and having 640 x 480 RGB resolution. They both accept composite and S-Video signals; the Data-Pro III also accepts compressed S-VGA and MAC signals, while the DataPro II accepts VGA and MAC signals. The valise-sized projectors weigh 18.3 and 19.8 pounds, respectively.

—LB



promote the network, which has yet to be named. The media giant will also assist with the development of an on-screen operating system that'll help users navigate the network's many options.

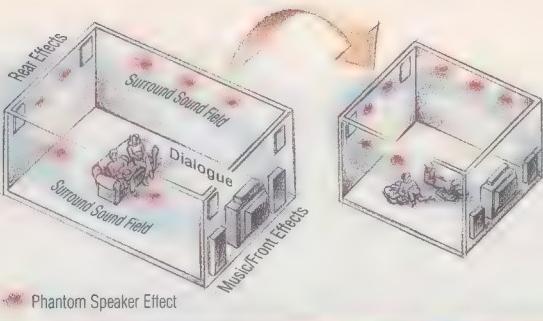
The telcos, meanwhile, will supply the local hardware and software required to deliver the programming and enable two-way interactivity. They'll also try to entice their current phone and cable-TV customers, who number 50 million in 19 states, to sign up.

Like some interactive-TV developers, MVI wants to use an "open architecture." That would enable other



telcos to transmit MVI's programming, while other program providers could create programming for MVI's network. No timetable was given for the network's launch.

—RS



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MPEG coding in theory and practice, from 22,300 miles in space

BIT STREAMS



IN THE WORDS OF ONE BEER COMMERCIAL, the world today is a pretty cool place. It's a high-tech, plugged-in cybertooth zoo, careening between a doctoral lecture on quantum mechanics and savage jungle warfare. The area between Things That Have Already Been Invented and Things That Are Impossible Because of the Laws of Physics is starting to show distinct signs of shrinkage. Never think, though, that all of the really cool things have already been invented—the best is yet to come. But a number of very stubborn problems remain, and they'll impede progress until we find a way around them. One of the biggest problems concerns the "last mile."

Currency speculators will be the first to tell you that the nations of the world now have a common currency. It's called information. It flashes around the globe at near-light speed—in the form of news, gossip, transactions, documentation, jokes, education, entertainment, and much, much more—for anyone who cares to plug in and pull it out of the ether. An absolutely incredible infra-

structure is out there, carrying trillions of bits of digital data per second. The problem is how you connect to it. Whether you're sitting at home or driving to the Dairy Queen, your personal access to information—that last mile from the vast network to the individual user—remains limited.

The problem is not the information itself, but the volume of data needed to convey it and the means we currently have of doing so. The magnitude of digital data required to code a simple video program, for example, is enormous. Most American homes receive "standard" video, an analog composite signal adhering to the NTSC standard, with a bandwidth of 4.2 MHz. To digitize it, the Nyquist theorem, which governs all efforts at digitization, demands a sampling frequency of 8.4 MHz. At 8 bits per sample (8 bits is the length of the typical digital "word," or "byte"), this yields a data stream that'll flow at 67.2 megabits per second (Mbps). Because a color image is comprised of red, green, and blue components, this rate must be multiplied by three to accommodate

each of them, yielding a total bit rate of 201 Mbps. A conventional 650 megabyte optical disc (like the music CD) could store about 26 seconds of this digitized video program, and, at the playback rate of a conventional CD player, it'd take 72 minutes to play that 26-second segment back.

Yes, it's a vast, thick data milkshake out there, and the straws we currently use to suck it up are very thin. The copper wire that brings phone and cable-TV service into our homes—and will bring much more in the near term—isn't capable of conveying much in the way of digital video data. So we have two choices: We can buy a bigger straw, which sounds simple but isn't, since the cost of running high-bandwidth cabling into American homes would run into the hundreds of billions of dollars. The better choice, then, is to thin the milkshake a little by reducing large data files to a smaller size, so they flow through the last mile at a quicker, more efficient speed.

There are a number of brute-force ways to reduce the size of a video file. The frame rate can be reduced, the size of the image can be reduced, and/or the number of bits used to code colors can be reduced. These tricks are routinely used in the universe of multimedia PCs and the World Wide Web, with results that aren't even up to VHS standards.

A more subtle trick is to decrease a file's size by examining the file for irrelevant information within each frame as well as over a series of frames; once identified, the redundant data can be eliminated. This technique can be very efficient at preserving picture quality, while delivering the low bit rate we need to fit video through our straws.

There are a number of audio/video data-reduction standards, but the MPEG standards (devised by the Motion Picture Experts Group) are among the best and most commonly used. These stan-

dards describe how to perform the calculations needed to reduce the data in video and audio files. Using the limitations of our eyes and ears, as uncovered by psychovisual and psychoacoustic testing, extraneous data can be carefully deleted. Depending on the extent of the reduction, and the quality of the calculations themselves, the effects of reduction can range from imperceptible to godawful.

The MPEG tale is pretty complex, but it appears that it'll be the basis of many (if not all) future home audio/video applications. The MPEG-1 standard came first, chronologically, and it's the simplest in the MPEG family. It can reduce audio/video data rates by various degrees, though the end result is always within range of the compact disc's 1.41-Mbps data-transfer rate. This allows data files to be stored on CDs and transmitted over computer networks and other media such as DSS.

Using the MPEG-1 algorithm, broadcast-quality video coded at 165 Mbps (the rate specified by the CCIR 601 standard, which is used for extremely high-end professional-caliber recorders) can be reduced to approximately 1.15 Mbps, a reduction ratio of 140:1. 1.41-Mbps audio data can be reduced to about 0.22 Mbps, a ratio of 7:1. The video and audio data are combined into a single data stream that, as mentioned, has a total rate of 1.41 Mbps. Generally, this is considered to be the minimum performance that's acceptable for full-motion, full-screen digital video. In other words, MPEG-1 is the thinnest straw anyone will buy.

The MPEG-2 standard uses a more sophisticated algorithm and provides higher picture quality than MPEG-1, though that comes at the expense of higher bit rates. It's also backward-compatible, so MPEG-2 decoders can accommodate an MPEG-1 bit stream. In addition, it provides a variety of video resolutions: High (with rates less than 80 Mbps), High-1440 (less than 60 Mbps), Main (less than 15 Mbps), and Low (less than 4 Mbps). The MPEG-2 standard has been accepted for use in the DVD and digital HDTV standards, and it can provide stereo or 5.1 digital multichannel sound [see "Surrounded," page 35] using audio algorithms similar

to those in MPEG-1. In one implementation, MPEG-2 specifies an NTSC video resolution of 704 x 480 lines and a PAL/SECAM resolution of 704 x 576 lines with data rates of 4 to 8 Mbps, a 16:9 aspect ratio, and interlaced fields.

But that's just one example. As mentioned, the MPEG-2 algorithm (and its MPEG siblings) can accommodate a wide range of bit rates and produce various levels of picture resolution. The

encoding algorithms aren't fixed, so they can be optimized for particular uses. In addition, MPEG encoders can be improved and upgraded, while existing decoders that were designed to accommodate these encoder upgrades will automatically convey the improved picture and sound quality when they're phased in at the encoder. In other words, MPEG is a well designed but flexible syntax that can be applied in

WEB WATCH

THANKS TO BIG-SCREEN TV SETS, SURROUND SOUND, AND DSS SYSTEMS, there's almost no reason to leave your home. Once you plug into the Internet, you can simply have the carpenters board up the doors. The best part of the Internet, perhaps, is the World Wide Web, which has quickly become a multimedia extravaganza of text, graphics, audio, and video. As long as you've got a reasonably fast modem connection (a 14.4-kbps modem is the absolute minimum), you can tap into the wild and wacky world of the Web.

By the time you read this, *Batman Forever* will be ready to wing its way out of movie theaters, but if we're lucky, its Web site will still be online. Log into <http://www.batmanforever.com> and you'll find lots of bat audio and lots of bat video. The complete theatrical trailer is available as a QuickTime or AVI videofile running at 10 frames per second. Thanks to my 10-million-bit-per-second LAN connection, I was able to download the 6.6-MB AVI file in 5 minutes, even during the Web's rush hour; a typical home modem might have taken an hour to get the job done. The tiny-screen video, which runs just under 2.5 minutes, can't compete with the silver-screen version, of course, but it sure whets your appetite—and shows off the Web's potential.

You'll also find some excellent high-resolution still images and some great audio clips from the movie soundtrack (featuring U2, PJ Harvey, and others). A unique touch is that, after you download the real-time audio-player software, you can listen to music directly from the site without having to download audio files first. This feature is hot right now and is spreading across the Web faster than newbies on their first browser stroll.

Any Web crawler with a passing interest in music should also check into <http://www.iuma.com>, otherwise known as the Internet Underground Music Archive. This site has information on over 600 unsigned independent bands and artists. You'll find MPEG audio clips, album covers, and other goodies on musicians ranging from the superb to the absolutely awful. If you've got a garage band, make sure you add your materials to the Archive, and join up with all the other permanently obscure and possibly famous musicians who are already jamming in cyberspace.

PHOTOFEST



Bats in the PC: Kilmer, O'Donnell

many ways, and in many different applications, wherever data reduction is needed.

The coding process is similar for both MPEG-1 and MPEG-2. In short, a video signal is broken down into its base components; these components are analyzed, and those that are judged extraneous are discarded. Though the long form wades into some pretty heavy tech speak, it's fascinating.

With a color video signal represented by red, green, and blue components, MPEG video reduction begins by converting these RGB "triplets" into three signals—one luminance and two chrominance—for more efficient coding. The two chrominance signals represent the difference between 1) the red and green components and 2) the green and blue components. Each video frame is then divided into blocks, with each block corresponding to a square multi-pixel area on the playback monitor. Next, the blocks are processed according to a mathematical translation called a "Discrete Cosine Transform." When the processing is complete, the frame is represented by a set of numbers called "two-dimensional frequency coefficients," which delineate the frequency content that appears in each block.

At this stage, the signal's output values are no longer pixels; the coefficients literally represent the level of energy in each frequency. Transform an image of nothing but finely spaced stripes to 2-D coefficients, for example, and you'd see a large value for the frequencies at which the stripe pattern was repeated, while all other frequencies would have a value of zero.

Once the signal is broken down into 2-D coefficients, the actual data reduction can begin. It's achieved by eliminating those coefficients that are characterized by low energy. A technique called "run-length coding," as well as a type of data compression called "Huffman code" (in which the frequency value that appears most often is assigned the shortest codeword), are the specific processes that are used to reduce signal content within each video frame.

As mentioned, most of MPEG's reduction work is achieved by pouncing on signal content that appears redundantly in sequential frames. Each frame isn't handled identically, however. Specifically, only the initial frame in a string

of largely redundant frames is fully coded. From there, the coder simply codes the differences it notes between that initial frame and the very similar ones that follow, using a process called "motion-compensated coding." In this process, a "displacement vector"—which you can think of as a simple directional pointer—is coded to indicate how many pixels the image in the current frame has moved in relation to the same image in the previous frame.

Accurate, fully coded frames do appear regularly in the bit stream, serving as references for the motion-compensated frames and minimizing the accumulation of artifacts, or errors. In sum, both MPEG processes code three frame types in a video sequence: Intra, Predicted, and Bidirectional (I, P, and B).

Accurate, fully coded frames serve as a reference for Bidirectional as well as Predicted frames.

Intra frames—the "accurate, fully coded frames" mentioned above—are self-contained; as noted, they serve as reference frames, aren't referred to other frames via motion-compensated coding, and are only moderately compressed. Predicted frames are referred to another frame (either a previous or subsequent I or P frame), and they're more highly compressed using motion compensation. Bidirectional frames are coded using a process called "interpolation prediction," which codes an *estimation* of the original signal content using displacement vectors from both previous and subsequent I or P frames, and they're very highly compressed.

The trick is that the precise sequence of I, P, and B frames, as well as the exact number of each type in any given multiframe sequence, varies according to the bit rate—which itself varies according to the relative complexity of the scene that's being encoded. Bottom line: MPEG coders are pretty smart, continuously weighing the importance of a program's video-signal content, as well as the manner in which that signal changes over time, against the way that human beings see. While it isn't per-

fect, MPEG can efficiently convey data over the last mile.

SOMETIMES THAT METAPHORICAL LAST mile stretches quite a distance. In the case of the DSS direct broadcast satellite (DBS) system, it literally runs 44,600 miles. DSS's audio/video programming consumes a lot of bandwidth, due to the large number of channels and the quality of their pictures and sound. Yes, it's another thick milkshake.

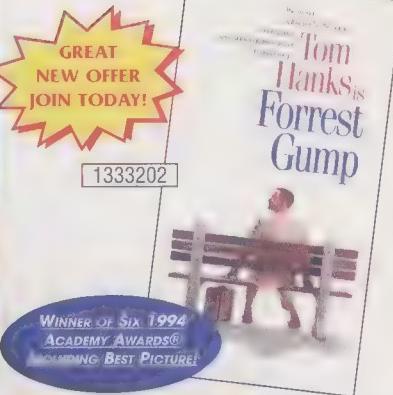
And DSS's straw is thin: The FCC only gives DirecTV and USSB, the DSS program providers, so much bandwidth to use in broadcasting their programming. The answer is data reduction and data compression.

DSS uses that portion of the spectrum known as the Ku band. Uplink signals (those that transmit programming from the service providers to the satellites) in this band must fall between 17.2 and 17.7 GHz, while downlink signals (those that broadcast programming from the satellites to earthbound dish/receiver systems) must lie between 12.2 and 12.7 GHz. Within that spectral limit, very few high-quality digital audio/video channels could be conveyed without data reduction or data compression. They'd look and sound great, but a few channels does not a world-beating entertainment service make.

DirecTV has determined that they need to offer roughly 200 channels to satisfy the breadth of consumer demand and turn a profit, so serious data reduction is absolutely necessary. The MPEG-1 algorithm has been used since the launch of the DSS format in the summer of 1994, with MPEG-1 encoders working at the program providers' uplink facilities. And consumers have generally been satisfied with DSS's picture and sound. However, MPEG-1 is far from perfect. Anticipating this, everyone involved with developing DSS provided an upgrade path. And that path leads to MPEG-2.

All DSS receivers, including first-generation models, contain an MPEG-2-decoder chipset. As noted, the MPEG-2 algorithm uses a higher bit rate as well as more sophisticated encoding to provide improved picture quality. Because an MPEG-2 decoder can decode an MPEG-2 or MPEG-1 signal, the last mile from the program providers to consumers can be upgraded at the pro-

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grammer's will. The best part is that the upgrade can be implemented without the consumer having to do anything at all—the program providers just have to uplink MPEG-2-encoded signals instead of MPEG-1 signals, and the satellites will simply broadcast them down to Earth. (A DSS receiver will automatically know which signal it's receiving.) And that's precisely what's happening now, as the DSS program providers are busy fine-tuning their MPEG-2 algorithm; the programming DSS owners receive is scheduled to be converted to MPEG-2 sometime this fall.

While MPEG coding significantly reduces the bit rate that represents a video picture, other factors come into play. One critical decision concerns how the channels are physically transmitted to Earth by the relay satellites' transponders. Three satellites—DBS-1, DBS-2, and, as of last June, DBS-3—figure into the equation. Each satellite has 16 transponders, and each transponder has a 120-watt amplifier; alternatively, each satellite can be configured with eight transponders, with each transponder having a 240-watt amp.

DirecTV uses 11 transponders on DBS-1, and USSB uses the remaining five. DirecTV also uses all 16 transponders on DBS-2. And DBS-3 will provide additional channel capacity for DirecTV, at the same time acting as an orbiting spare.

DirecTV can use their 11 DBS-1 transponders to provide up to 60 channels, while USSB can use their five to provide 20 or more channels. DirecTV can also increase their channel count by pairing DBS-2 with DBS-3 and configuring each bird with eight 240-watt transponders. Increasing the transmission power of each transponder (from 120 to 240 watts) decreases the percentage of the transmitted bit rate that needs to be applied to error correction, so more of the total available bit rate can be used to code audio/video data. Using two birds to do the work of one may seem inefficient, but it doesn't add up that way: This setup results in a 20-percent increase in total usable bit rate. In other words, combining DBS-2 and DBS-3 creates a fatter straw.

DirecTV has several options regarding how they'll use it. They can provide more channels, provide the same number of channels but increase their picture and sound quality, or add new fea-

tures—such as interactive services that allow a user to, say, order tickets or download videogames via their satellite receiver's built-in modem. DirecTV says that they'll probably pursue all of these options in time.

Though more channels and cutting-edge features will turn on many DSS subscribers, videophiles focus on the question of picture quality. For them, the original MPEG-1 encoding algorithm wasn't adequate. And though the MPEG-1 encoders used by DSS program providers have been continually tweaked since the system's launch (so much so that they're now referred to as MPEG-1½ encoders), videophiles are still critical.

It's incorrect to say that DSS, with all of its variables, simply uses MPEG-1 or MPEG-2 coding.

The problem they typically point to is picture artifacts, especially in scenes that are characterized by fast-moving images or in speedy scene-to-scene transitions.

DSS program providers have been aware of the existence of artifacts ever since they first started working with MPEG-1, which explains why they're using their new, big straw to encode programming with a version of the MPEG-2 algorithm. Each channel won't be individually encoded with MPEG-2, however—the combination of MPEG-2's high bit rate, the number of channels, and the FCC-allotted bandwidth in which DSS channels are broadcast simply doesn't add up. Instead, MPEG-2 will be accommodated in more efficient ways using both hardware and software upgrades at the uplink.

These upgrades are pretty clever, and efficiency is key. When the format was first launched, engineers manually assigned different bit rates to different channels. Premium pay-per-view movie channels, for example, were allotted higher bit rates, so that their films would be presented with a higher quality picture. In general, channels whose programs had relatively little on-screen action—The Weather Channel, for example—required fewer bits. Football

games and Mad Max movies, on the other hand, require more bits.

Today, program providers are making good use of the year-long experiences they've had handling bit-rate allotment. Instead of manually assigning a bit rate to each channel, they're using a process called "statistical multiplexing," which continuously and automatically varies bit rates among the programming based on content. A scene with a talking head receives a lower data rate, for example, while a fast-action event like a car chase receives a boost in data rate; if one channel on a transponder is showing a football game and all of the other channels on that transponder are occupied by talk shows, the game will be allotted a massive data rate. This give-and-take is dynamically varied among all of a transponder's channels, with the transponder's maximum data rate (or that of two paired transponders) being the pool from which individual data rates are taken.

For this reason, it's incorrect to say that DSS, with all of its variables and complexities, simply uses MPEG-1 or MPEG-2 coding. The more accurate statement is that DSS programming is conveyed in a highly customized manner using a statistically multiplexed bit stream that's MPEG-2-compatible. Since a typical program has scenes whose signal content constantly varies from simple to complex, most programs will use MPEG-1, MPEG-1½, and MPEG-2 coding (once the MPEG-2 upgrade is complete) to some degree.

THE QUESTION OF PRIORITY—OF whether picture quality, number of channels, or features is given more bits relative to the others—is an economic decision the program providers make on an ongoing basis. Over the coming months and years, DSS's program providers, as well as programmers working with other MPEG-based delivery schemes, will continue to upgrade their encoders and their encoding methods, making just these kinds of priority decisions. So it's important for the viewing public to voice its compliments and complaints. That last mile is your personal link to the world of information. How much information you wish to receive, and its picture and sound quality, is largely up to the laws of supply and demand. In other words, it's largely up to you.

—Ken C. Pohlmann

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VIDEOTEST SPECIAL

Heaven Sent

Sony's SAS-AD1 leads DSS's second wave

BY KEN C. POHLMANN



WE DON'T NEED a compass to tell us where we are. We're midway through the Digital Decade, and we're loving it. Every day, more and more of us are taking our first tentative steps into cyberspace, thrilling to the stunning digital recreation of our favorite Mahler symphony, or recoiling in fear as a computer-generated velociraptor approaches, savage intentions shining in its eyes. It's all made possible by seemingly innocuous strings of binary code—the ubiquitous 1s and 0s that only a computer can love. And that binary code is behind the most exciting advance in home entertainment since the compact disc. To find it, you have to look due south and about 22,000 miles straight up into the sky. That's where you'll find a trio of satellites hard at work, beaming digital TV programming directly into American homes. The technology is formally known as the Digital Satellite System (DSS), and Sony has joined RCA, the first company to sell DSS hardware, in offering satellite-dish/receiver systems that are capable of receiving DSS's 175

channels of programming. The SAS-AD1 (\$949) is the priciest of Sony's three DSS systems.

We're not the only ones excited by DSS. Even though the format's 1994 launch was geographically limited for a spell, and despite the fact that there weren't enough systems to satisfy demand last Christmas, roughly 1 million DSS systems now reside in American homes. That's a staggering number when you consider that only 35,000 CD players were sold in 1982, the year that format was launched.

The 1-million milestone was particularly important to Sony, the second DSS licensee. Thomson's RCA brand had sole rights to manufacture the first 1 million DSS systems, with exclusivity ending in June; the 1-million mark was hit in May, and Sony promptly announced their systems ["Fast Forward," July/August 1995] as well as plans to introduce them this summer.

Sony is no newcomer to DSS technology, though: The company's professional division was instrumental in the design and construction of the uplink facilities owned and operated by DirecTV and USSB, DSS's

two program providers. When programming is sent from these facilities to the DSS satellites, much of it passes through Sony pro products.

FEATURE PRESENTATION

The SAS-AD1 includes the SAN-18D1 antenna, the SAT-A1 receiver, and the RM-Y130 remote control. If Thompson's DSS experiences are any indication, roughly a third of the people who eventually buy a Sony DSS system will opt for this top-of-the-line package, partly because of the dish's dual-output low-noise blocker (LNB), which is capable of feeding two different signals to two DSS receivers simultaneously. The AD1 system also includes several features that, according to Sony, make the system easier to both install and use.

The SAT-A1 receiver is the heart of the AD1. It's a trim component, measuring 3.25 x 17 x 10.9 inches (h/w/d), and its metal chassis wears a face of industry-standard charcoal-gray plastic. At first glance, it might easily be mistaken for a VCR or CD player.

Like that of RCA's receivers,

PHOTO BY TONY CORDOZA

SONY

DSS



the A1's front panel is pleasingly spartan and surprisingly unimposing for such a sophisticated device. It offers only a few controls—POWER on/off, MENU, EXIT, and TV/DSS select—plus four cursor keys (marked with arrows) that surround a multifunction SELECT button. These controls are duplicated on the unit's impressive remote, however, so A1 owners probably won't use the front-panel set very often.

There are three front-panel indicators: one for power, one for DSS reception, and one that lights up whenever one of the program providers has sent you a promotional or personal message; messages are accessed via the remote and one of the A1's many on-screen menus. (The MESSAGE indicator will be marked MESSAGE/TIMER on the A1s you see in A/V shops; more on the timer in a bit.)

A hinged door marked with a PULL legend conceals a slot that holds a removable DSS access card. The card contains identification and billing software. It needs to be in place when you turn on the system, so it provides a measure of security. It also needs to be there when you select pay-per-view (PPV) programming; when you do, the receiver automatically phones in your request via an onboard self-dialing modem that connects to your phone line.

One of the A1's most useful features—and an advance over the RCA DS2430RW DSS system I evaluated in the summer of 1994—is its programmable seven-event/30-day timer. You can program the A1 as you would a VCR, selecting turn-on/off times and a channel. Program your VCR to coincide with the A1 and you'll be floating in time-shift heaven.

Around back, you'll find the A1's business end, and what it's selling is flexibility. The receiver provides video RF jacks that you link with the dish via a length of RG-6 coaxial cable. A VHF/UHF input jack that accepts standard F connectors lets you plug in a standard (terrestrial-broadcast) TV antenna or cable-TV feed.

There are three options for getting the signal from the receiver to your TV. The least sophisticated is a VHF (SAT)/UHF output jack with a channel 3/4 switch. Enthusiasts, however, are likely to prefer the phono jacks, which provide video and stereo audio outputs (a similar set of jacks offers an extra video output and a mono audio output), or the S-Video output jack.



On track: the RM-Y130 remote

"Control-S" input and output jacks are on hand for adding the A1 to the infrared (IR) control bus of other compatible Sony components; a Control-S-linked system can be operated by one compatible remote control. To accommodate the receiver's built-in modem, there's a modular RJ-11C telephone jack. Finally, in anticipation of future programming applications, the A1 provides a 15-pin wideband data port and a nine-pin low-speed data port, both of which use computer-style D-Sub connectors. DSS's program providers plan to use these ports to deliver interactive programs as well as data services; the ports will connect the A1 to either your home computer or a sophisticated next-generation set-top box.

CONTROL CENTRAL

The RM-Y130 is the André Previn of this particular orchestra. It's a universal learning remote control that's preprogrammed to operate many brands of TVs, VCRs, and cable boxes; you can "teach" it to operate other remote-controllable components. The Y130's most striking feature is its mouse-like trackball pointer, which allows fast point-and-click operation. This is a pro-

foundly ergonomic design: Roll the spring-loaded rubber-coated trackball and the associated on-screen cursor will step or jog (depending on how far you roll it) through the many on-screen menus; click down on it once and the menu field indicated by the cursor will be highlighted.

A number of dedicated buttons on the remote allow direct access to commonly used menus and features. The CHANNEL/PAGE buttons let you sequentially surf channels or page through menu displays. The DISPLAY button puts information about the current channel on-screen. The JUMP button lets you switch back and forth between two channels. A 10-button keypad selects stations and menu items directly and can be used to enter spending limits for PPV as well as passcodes for blocked channels. Volume and mute buttons are provided for controlling other components; transport controls are located under a hinged panel.

One other very hip feature of the remote is that it emits both IR and RF signals. The RF transmissions let you control the receiver if it's stowed in a cabinet or if you're in another room.

DEEP DISH

Collecting the system's digital bit-stream signal from the Great Beyond is left to the SAN-18D1 antenna, whose compact aluminum parabolic dish measures 21 inches high by 18.4 inches wide. Its slightly elliptical shape is largely a cosmetic touch, though Sony says it cuts down on wind noise. In addition, it's said to allow the LNB's arm to be shorter, which is claimed to create a better focal point for reception. As on RCA's dish, the LNB arm is round, which is said to help minimize buildup of snow and debris; such buildup can mar reception.

Thomson has said that about 40 percent of their DSS customers installed their system themselves. Sony officially encourages professional installation, but they anticipate a boost in do-it-yourself installs as the DSS market grows. So they designed in a couple of tweaks that help make the job go a little easier. You need a southern exposure to use a DSS package, since that's where the DSS birds hover. But you also need to fine-tune the position of the system's dish so that it's picking up the strongest signal possible. Sony's dish helps out here with the SignalSeeker, a red LED that's mounted in the body of

the LNB. It's activated when the receiver is placed in its diagnostic signal-strength mode. As its name implies, the LED flashes slowly when the signal is unlocked and flashes more quickly as signal strength increases. When you've reached the ideal orientation, the LED should be *streaking*. The SignalSeeker makes basic setup a one-person job. You should still use the on-screen meter to fine-tune the dish's orientation, though—while the LED is convenient and quite accurate, the on-screen meter will help you dial in a final margin of accuracy. And every bit counts.

One other dish feature: As mentioned, Sony has followed RCA's lead by providing a second output jack on its top models. This lets you connect one dish to two receivers, which can be installed in separate rooms. This lets you, say, watch a football game downstairs, while your wife or kids watch a movie upstairs. While accessory kits enable single-output dishes to feed up to five TVs, only one DSS channel can be viewed at a time.

ACCESSORIZING

Speaking of accessories, Sony offers a bunch of optional ones. Among the usual standalone remote controls, cables, and signal-routing hardware are two notable items. The ANJ-DS1 installation kit (\$80) contains everything you'll need to set up the system, including antenna mounting hardware, a couple of RG-6 coaxial cables (running 25 and 75 feet), a telephone line cord and connectors, a compass for aligning the dish, and, for the faint of heart (or terminally curious), an installation videotape.

Serious users may also wish to consider the MRD-D1 multiroom distribution system (\$250). The base unit accepts signals from three sources, which can then be routed to up to five TV sets using standard RG-59 coaxial cable. There are phono-jack inputs for video and stereo audio from a DSS receiver plus another video source (perhaps a second DSS receiver, a VCR, or a laserdisc player); an RF input for a cable-TV or standard broadcast signal is also provided. Signals for each set are conveyed as unoccupied midband or UHF TV channels; the same cable shares both satellite and conventional TV signals, and each TV can be individually tuned with no interference between sets. In addition, if you throw in optional EAC-T1 infrared targets (\$25

apiece), you can use a remote to transmit IR signals from a secondary room through the cable to the main room.

GREAT INSTALLATIONS

My installation of the SAS-AD1 system began with the receiver. Its video and audio outputs were easily connected to a VCR and A/V receiver; the A/V receiver, in turn, conveyed the video signal to the TV set. This configuration allowed me to record off-air and to use the A/V receiver to switch between the DSS and VCR sources. The system doesn't allow you to record one satellite program while watching another, and if a PPV signal is protected by Macrovision copy-guard coding, you have to turn off the VCR if you want to enjoy an undistorted picture. I also connected a cable-TV lead to the DSS receiver's UHF/VHF input jack so I could switch between cable and DSS signals. Like most people, I can't use DSS to get local broadcast stations in my area (though it's possible in some areas), so I needed a cable or antenna feed to get local programming.

Wiring tasks completed, I powered up the system. The DSS receiver responded by displaying "Searching for Satellite Signal" on the screen—an understatement, considering that I hadn't set up or connected the dish. I used the

BY THE NUMBERS

Measurements by Berger-Braithwaite Labs

Horizontal resolution: >480 lines

Picture S/N: unweighted video, 49.7 dB; weighted video, 51.3 dB; chroma AM, 55 to 58.5 dB; chroma PM, 56.2 dB; chroma output, 706 millivolts; video output, 407 millivolts

Audio frequency response: 20–20,000 Hz +0.01, -0.5 dB

For this test, a series of standard video and audio test signals were uplinked from DirecTV's Castle Rock, Colorado facility and broadcast on a standard DirecTV channel that was temporarily set aside for this purpose. Our SAS-AD1 sample received these signals at our New York City test facility.

remote to select the System Menu, then the Installation Menu, and, finally, the Set Up Antenna Menu. I was then prompted to enter my zip code, which told the system where I was located in relation to the DSS birds; a moment later, the unit spit back the azimuth and elevation coordinates I'd need when setting up the dish.

Leaving the receiver in the Set Up Antenna menu, with the screen showing zero signal strength, I connected an RG-6 coaxial cable to the DSS receiver and ran it outside to a grounding block.

CONTINUED ON PAGE 93

CHANNELING

HARDWARE INTRODUCTIONS AREN'T THE ONLY NEWS SHAKING DSS'S WORLD. While program provider USSB continues to offer its bargain movie-channel packs, programmer DirecTV has added more than 25 new channels over the past 9 months, expanding its already extensive channel repertoire to roughly 150. And DirecTV shows no signs of stopping there, thanks to the launch of the third DSS satellite, DBS-3, last June. "Once the satellite is operational," says Thomas Bracken, DirecTV's vice president of communications, "we'll be able to immediately add approximately 30 channels."

A comprehensive sports package is the highlight of DirecTV's recent additions. The package is part of an agreement with Rainbow Programming Holdings; DirecTV says it makes them the "largest sports carrier in the world." As a result of the deal, DirecTV now offers SportsChannel Regional Network, which gives subscribers access to local pro and college sports action. Starting September 3, DirecTV will also offer more pay-per-view sporting packages. Their popular NFL Sunday Ticket package (\$139), which provides subscribers with as many as 12 professional football games on any given Sunday during the season, will be offered again for the 1995-96 season, as will their NBA League Pass (\$149) and NHL Center Ice (price not available at press time) programs. (A Major League Baseball package for the '96 season is a high priority.) Other additions include the Madison Square Garden network and NewSport, a 24-hour sports-news network.

Pay-per-view and general programming are also getting a boost. Included in the Rainbow deal was the American Movie Channel (AMC), and Bravo and The Independent Film Channel are slated to be added sometime this fall. DirecTV is also broadcasting a second feed of STARZ!, the 24-hour premium movie channel offered by Encore Media Corporation.

—Chuck Tannert

**Next-generation
videogame
systems arrive**

BATTLE STARS

FOR BUG ZAPPERS AND ROAD racers across the country, the long wait for the next generation of game systems is finally coming to a close. Sega's 32-bit Saturn is here in force, and Sony's 32-bit PlayStation was scheduled to hit stores by late summer. Only a short jaunt down the road, the M2 Accelerator, a 64-bit add-on for the 3DO system, and the 64-bit Ultra 64, from videogame stalwart Nintendo and workstation-wizard Silicon Graphics, will touch down. Boasting blazing processing speed, eye-popping graphics, and room-filling sound, the new systems offer dramatically improved gameplay over their 16-bit predecessors.

Game-system buyers looking to upgrade during the 1995 holiday season should try to be patient. Originally, the Saturn and PlayStation were to be

joined this fall by the Ultra 64. Late last spring, however, Nintendo announced that they needed a little more time to get the player's software just right and postponed Ultra 64's debut until next April. 3DO's M2, on the other hand, is scheduled to appear by Christmas. If nothing else, consider that the Ultra 64 uses a more powerful processor and is expected to cost less than either the Saturn or PlayStation.

Ultra 64 will feature a 64-bit central processing unit (CPU), a custom graphics processor, and an audio engine, all of which have been developed by MIPS Technologies, a frequent partner of Silicon Graphics. According to Nintendo, the Ultra 64's CPU will run at an eye-blurring 100 MHz—that's the speed of one of the fastest Pentium chips you can get for a PC.

Nintendo has announced a \$250 pro-

jected suggested retail price for the Ultra 64, which would clearly make it the price leader among next-generation systems; the Saturn currently sells for between \$399 and \$449, the base 3DO system was recently reduced to \$300, and the PlayStation is expected to sell for \$299. The trade-off, if it really is one, is that Nintendo's system will play silicon cartridges instead of CD-ROMs. Some experts question whether the carts will be able to handle complex video or graphics-heavy data with the aplomb of CD-ROM-based games; Nintendo is already at work on a second-generation non-cartridge-based storage device.

At this stage of the game, it's impossible to tell how closely the Ultra 64 system we'll see next spring will adhere to Nintendo's widely publicized performance target. I recently visited



BY JAMES K. WILLCOX

Silicon Graphics' headquarters and was able to see some early Ultra 64 works-in-progress, and all of them looked stunning . . . but the games were running on an emulator that only approximated Ultra 64 performance.

A more pressing issue, at least as far as holiday shopping is concerned, is how the Sega and Sony systems stack up. [For a gameplay comparison, see "Face-Off!" at right.] To fully understand the advances that the new systems represent, however, you need to know a little bit about how they work. A bit—an acronym for "binary digit"—is the most elemental piece of data a computer can process. In order to process data more quickly and efficiently, individual bits are grouped together into longer units. When Sony and Sega state that their systems have 32-bit processors, they're generally referring to the number of bits of data their systems can process at one time.

Having a 32-bit processor is no guarantee of a system's overall performance, however. Like a 400-horsepower engine in a car with a bad clutch, a system with a 32-bit processor has just one of several elements required for outstanding performance. A case in point are personal computers, which often have ripping-fast CPUs, but become anemic when asked to play a fast-moving, graphics-intensive Windows-based game. That's because even a fast CPU (which is really optimized for crunching numbers) can bog down when it's asked to do too much work at one time. As a fix, PC gamers typically add dedicated boards, such as a graphics-accelerator card, to boost performance to acceptable levels.

Game-system companies have taken two steps to solve this problem: First, they've moved to Reduced Instruction Set Computing (RISC) processors instead of the Complex Instruction Set Computing (CISC) processors used in most home PCs. The CISC type of processor works with long, complicated sets of instructions, while the RISC processors perform narrower types of calculations. But RISC processors tend to be more efficient, so products using them—like the new game systems—are able to process information more quickly. And speed is essential for fluid, lifelike gameplay.

Second, game-system makers have offloaded some of the tasks from the CPU onto several other processors, each

FACE-OFF!

TO GET A HANDLE ON THE GAMEPLAY PERFORMANCE OF SEGA'S SATURN AND Sony's PlayStation, I spent several days this summer putting the systems through their paces. The Saturn I used was a test sample from the full U.S. production run, while the PlayStation was a Japanese unit sent here for review purposes; the only difference between this PlayStation and U.S. units, Sony says, is that the Japanese version has an S-Video output and the U.S. version won't have one.

One qualifier: A head-to-head comparison of this type is full of variables. When you're comparing two laserdisc players, you can play identical software while evaluating each component. That's not the case here, obviously, since the games designed for these systems are incompatible with one another. While I compared the game systems themselves, the differences in software have to be considered.

In any case, it was impossible to enter this head-to-head challenge without some expectations, especially since I'd spent a good bit of time comparing the system's inner workings. On paper, at least, the Saturn appears to be the superior system, with two CPUs to the PlayStation's one, the ability to generate more polygons per second (200,000 to 180,000), the use of more total system memory (4 MB of RAM to 3.5 MB), a more sophisticated sound chip (32-channel to 24-channel), and MPEG compatibility (via an optional cartridge) for playing back videos. For its part, the PlayStation's one CPU is faster than either of the two used by the Saturn, but it employs JPEG-only video, a format that some analysts say is nearing obsolescence.

It came as something of a surprise, then, when similar games looked and played better on the PlayStation. My test sample of the PlayStation came with two titles—*Ridge Racer*, a driving game, and *Toh Shin Den*, a martial-arts bopper. For comparison, I used the *Virtua Fighter* fighting title and *Daytona USA* driving game that Sega supplied with my Saturn sample; Sega also supplied *Panzer Dragoon*, a sci-fi adventure, and *Clockwork Knight*, a platform-style side-scrolling game similar to *Super Mario Bros.*

While both driving games featured impressive graphics, *Daytona USA*, as played on the Saturn, suffered from choppier animation and objects that seemed to pop up out of nowhere. *Ridge Racer*, as played on the PlayStation, offered better steering control and smoother animation.

In the shootout among martial-arts games, I again preferred the PlayStation game, *Toh Shin Den*, over the Saturn/*Virtua Fighter* experience. While *Virtua*'s action and graphics offer true arcade-level excitement, it was noticeably slower than *Toh Shin Den*. In addition, the fighters in the Saturn game looked much more like unrefined polygons, giving them a "blocky" appearance compared to the more sharply defined fighters in the PlayStation game.

Though there is no PlayStation counterpart as yet, I couldn't help but load up *Panzer Dragoon* into the Saturn, and I'm glad I did: The graphics and gameplay in this shooter were truly stunning. The opening cinematic sequence was among the most impressive visuals I've seen on a home game system at any price.

This is key: It's going to take game developers 12 to 18 months before they really learn how to design games that take advantage of the systems' capabilities. Compare a newer 3DO title like *Gex*, for example, to early 3DO releases—it's hard to believe they're running on the same game hardware. While there are a few titles that'll be exclusive to each of the new systems (*Mortal Kombat 3*, for example, will be a PlayStation exclusive for 6 months), most major game developers have pledged that they'll create titles for all of the major game platforms, so a desire to play a specific game shouldn't affect your choice of a game system.

Whether or not you decide to buy a Saturn or PlayStation this fall will probably be decided more by disposable income than by a clear superiority in either system's hardware. Both systems clearly offer a breakthrough in game performance, and that alone should justify the outlay.

—JKW



Kool: *Mortal Kombat 3*

of which is designed to tackle a specific computing task. By adopting this multiprocessor approach, the systems are able to assign difficult operations, such as creating 3-D graphics, to specialized chips that focus exclusively on performing that task. Sega's Saturn uses a total of eight microprocessors, and Sony's PlayStation uses six. (3DO's M2 Accelerator is said to feature 10 custom co-processors in addition to its 64-bit RISC-based PowerPC 602 CPU; Nintendo hasn't yet released full construction specs, but the Ultra 64 system should feature a multi-processor design.)

There's more to the Saturn and PlayStation than processors, of course. Outfitted in a black-plastic shell and offering a double-speed, top-loading CD-ROM player, the Saturn vaguely resembles the earlier Genesis system, a resemblance that is most certainly only skin-deep—just a few moments of game action leaves all recollections of Genesis far behind.

The Saturn's controls are straightforward, with two lozenge-shaped buttons for power and reset flanking a larger button that opens the CD lid on the top of the unit. Behind the CD tray is an opening that looks like a Genesis cartridge slot, but isn't (the Saturn can't play Genesis or Sega 32X games). The opening is actually an expansion slot



Sony PlayStation
Below: Sega Saturn

for adding peripherals, such as a 512K RAM cartridge (\$60) for storing game data. In addition to CD-based games, Sega says that the Saturn will play music CDs, CD+Graphics discs, CD+Extended Graphics discs, and, with the use of optional adaptors, Video CDs, Photo CDs, and electronic books.

On the back of the Saturn console are two standard RCA audio outputs as well as RF, RGB, S-Video, and HDTV video outputs. The back panel also offers an AC input, a RS-232 communications port (for multi-player, two-site

gaming via a modem), and a door that leads to a slot for a backup battery as well as a receptacle for a future add-on MPEG-2/Video CD adaptor.

All play on the Saturn is directed via the supplied control pad, a fairly conventional-looking controller with a directional pad on the left and six buttons situated in two rows on the right. Two large shift buttons are located at the front of the unit. The controller also directs basic functions when playing a music CD.

In terms of pure horsepower, Saturn's numbers are impressive. Running the show are a pair of Hitachi-built SH2 32-bit RISC CPUs, each of which runs at 28.6 MHz; combined, the CPUs are capable of delivering 50 MIPS (millions of instructions per second). Hitachi's SH1 32-bit RISC processor is on hand to operate the CD subsystem, and a custom sound chip developed by Yamaha is used to kick out 32-voice, CD-quality audio. Other processors include a system manager and a peripheral controller, which manages inputs from the peripherals, and the System Control Unit, which synchronizes the activities of all of the other chipsets.

Two 32-bit video-display processors (VDPs) are responsible for generating the graphics, working together to produce the on-screen images and backgrounds. The VDP1 generates characters and gameplay images—called "sprites"—as well as effects such as "texture-mapping" and "Gouraud-shading," while the VDP2 creates backgrounds and effects such as rotation and scrolling.

Texture-mapping is a technique used



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to create 3-D characters and objects by creating a computer-generated 3-D wireframe skeleton and then "wrapping" an image—or, for a particularly realistic effect, a photograph—onto it. Because objects and characters are created as polygons, game developers use the Gouraud-shading smoothing technique to round the polygonal object, reducing its geometric appearance. In general, the more polygons the system can generate every second, the more realistic objects and characters will look and move. The Saturn can create 200,000 texture-mapped polygons per second and 500,000 flat-shaded (without texture) polygons per second, and it has a palette of 16.7 million colors. For comparison, Sega's Genesis works with ■ mere 64 colors.

The Saturn comes packed with one game, the martial-arts scrapper *Virtua Fighter*, and one game controller; a second controller costs \$35.

With the launch of the PlayStation, Sony becomes the new kid on the game-system block (though their software arm, Sony Imagesoft, has been publishing games since the days of the 8-bit Nintendo Entertainment System). With the debut of their first game hardware, Sony brings a formidable amount of technology, marketing muscle, and brandname awareness into the videogame arena. Still, the PlayStation has to deliver the videogame goods.

Slightly smaller and more stylish in design than Sega's Saturn, the gray PlayStation is not only sexier, but at \$299, it should be priced at least \$100 below the Saturn. Sega executives point out that the price difference is mitigated by the fact that the PlayStation doesn't come bundled with a game, while Saturn does. Like Saturn, PlayStation ships with a single controller; Sony hasn't set the price for a second controller.

The PlayStation is laid out in similar fashion to the Saturn, with a top-loading CD tray and a pop-up cover, but it has large, circular buttons for open, power, and reset functions. There are ports for two controllers on the front of the unit plus standard RCA A/V jacks and an RS-232 jack, for modem'd two-site play, on the back. (Sony recently re-engineered the system, removing an S-Video jack that was included in the Japanese version, probably to help the PlayStation meet its \$299 retail price.)

Most striking at first glance, perhaps, is the PlayStation's unique-looking con-

troller, which features a wing-shaped design and four directional buttons, instead of the usual directional pad, located on the left side. Buttons marked SELECT and START are situated in the middle, while a four-button array located at the right controls game action. Four additional buttons (two more than Saturn's) are mounted on the front of the control unit; the extra buttons can be pressed into service for a variety of functions, depending on the individual game's requirements.

Like Sega's Saturn, the PlayStation uses a multiprocessor architecture, though its main CPU is a single-chip design. Reducing silicon in this fashion kept the PlayStation's profile smaller and its manufacturing costs down. The PlayStation's choice of CPU is a custom R3000A 32-bit RISC chip developed by LSI Logic; the CPU runs at a fast 33-MHz clip. While the PlayStation relies more heavily on its single RISC chip than Saturn leans on its RISC chip, the responsibility for producing the system's excellent graphics is offloaded to two graphics subsystems: a graphics processing unit (GPU) and a geometry engine (GTE). The PlayStation also employs a data-decompression engine (MDEC) for video playback, a CD drive controller to handle the information spooling off of the double-speed CD-ROM player, and a 16-bit sound processor that produces 24-channel audio and special sound effects.

While all of the PlayStation's capabilities are up to snuff, graphics is where the system really shines, with the GPU and GTE working in tandem to create the on-screen action (similar to the Saturn's two-VDP approach). The PlayStation's GPU is responsible for rendering the games' character sprites, effects such as rotation and scaling, and producing the system's 16.8 million colors. The GTE handles texture-mapping, Gouraud-shading, and fog (yes, fog) effects. Sony says that PlayStation can produce 180,000 texture-mapped polygons or 360,000 flat-shaded polygons per second.

IT'S CLEAR THAT SEGA'S SATURN AND Sony's PlayStation have what it takes to deliver exciting gameplay. Both prove that our long wait for this next generation of gaming systems hasn't been in vain. If you simply must buy a game system this holiday season, this is where you'll find the cutting-edge technology. ■

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to a Cambridge SoundWorks *Ensemble* satellite (but with magnetic shielding). \$149⁹⁹. *Center Channel Plus* uses an ultra-low, ultra-wide design that is ideal for placement above (or, with optional support stand, below) a TV monitor. \$219⁹⁹.



Surround Speakers

Cambridge SoundWorks makes two "dipole radiator" surround sound speakers. Dolby Laboratories recommends dipole radiator speakers for use as surround speakers. *The Surround*

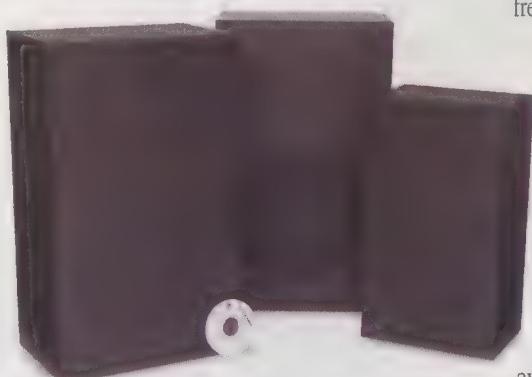
Surround has a very high power handling capacity and is often selected for "high end" surround sound systems.

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built-in electronic crossover. *Stereo Review* said it provides "deep powerful bass...31.5 Hz bass output was obtainable at a room-shaking level...they open the way to having a 'killer' system for an affordable price." \$699⁹⁹.

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SURROUNDED

Dolby Surround AC-3 digital surround sound
lives up to all of the hype

BY DANIEL KUMIN

ACH TIME TECHNOLOGY DEEVEES a quantum boost to the human condition history adds a new platitude to the common lexicon. So it seems probable that right now someone somewhere is saying "If nature had meant us to listen to multichannel digital sound we would have five ears."

Nonetheless multichannel digital sound is upon us in the form of Dolby Surround AC-3. This digital format derived from the firm's Dolby Digital movie theater system is quickly assuming the mantle of the *de facto* standard for next generation home theater surround sound.

AC-3 products are already in A/V shops. Enlightened Audio Designs (EAD) an American audiophile manufacturer was the first out of the gate; their TheaterMaster (\$6,995) is a sophisticated component comprised of a D/A converter, digital preamplifier and AC-3/Dolby Pro Logic (DPL) proces-

HOLIDAY 1995 CORDIZA

sor. Denon, Pioneer, and Yamaha, among others, are only a few weeks or months behind with more affordable components boasting AC-3 processing. Denon, Mitsubishi, Pioneer, and Runco have also released laserdisc players with AC-3-compatible RF outputs, and other LD-player makers are expected to follow suit in the short term. [For more on upcoming AC-3 products, see "New AC-3 Gear," below.] So the time seems right to determine just what we stand to gain—or lose—in the transition from matrixed analog Dolby Surround sound, as decoded by DPL processors, to the discrete multichannel variety represented by AC-3.

HOW AC-3 WORKS

The technology behind AC-3, which stands for Acoustic Coding-3, is fairly complex. AC-3 is a "reduced-data" digital format that carries five-plus-one audio channels in a data stream that travels at a rate of 384 kilobytes per

second. This data rate is far less than one-third of that used by music CDs and the digital-audio tracks of LDs, both of which use linear pulse-code-modulation (PCM) digital technology and only two channels.

The "reduced-data" part of AC-3 depends on a process called "perceptual coding," which is also used by the digital compact cassette (DCC) and mini-disc (MD). It works like this: A soundtrack's channels are analyzed as numerous, relatively narrow frequency bands. On an instant-by-instant basis, each band is dynamically allocated just enough digital-audio bits to do a good job of carrying the audio signal at the slowest bits-per-second rate possible while still preserving the desired level of sonic transparency. The process relies on a "psychoacoustic" model, which simulates the way the brain processes sonic information. Sonic elements that are inaudible (because they fall below the threshold of audibility or

are "masked" by louder sounds at nearby frequencies) need not be coded at all, saving a huge number of bits. And soft sounds are coded with only a relatively small number of bits. While all of this is happening, the coder embeds instructions that will be used later by the decoding circuitry (AC-3, in this instance), telling it how to reconstruct the audio signal.

Additional data efficiency comes from analyzing all of the frequency bands of all of the channels simultaneously. Since at least one or two channels will be either completely silent or nearly so most of the time, you can get a great deal from a very low bit-rate; witness AC-3's 10:1 advantage over standard 16-bit PCM digital coding. Perceptual coding (or, as Dolby terms it, "audio coding") is essential for reproducing digital audio in bit-rate-starved media like laserdiscs, broadcast and satellite TV, and computer multimedia.

Dolby has considerable expertise in this arena: They developed AC-2, AC-3's antecedent, nearly a decade ago as an extremely efficient two-channel link (between broadcast studios and transmitters, for example). And, in terms of its psychoacoustic underpinnings, AC-3 isn't very different from the analog noise-reduction techniques Dolby has studied for 30 years.

On this foundation, Dolby Surround AC-3 provides five channels—front left, center, and right plus fully discrete left and right surround ("rear") channels—as well as a dedicated subwoofer channel that Dolby has limited to a range of 20 to 120 Hz. (This is why the technology is also referred to as "5.1-channel.") All five main channels can carry full-bandwidth signals (from below 20 Hz to 20,000 Hz), but the format provides for some (or all) of these channels to be digitally filtered so that their bass content is sent to the subwoofer channel; this would be desirable for any channel that isn't served by a full-range speaker. (Any individual channel, of course, can employ a dedicated subwoofer/satellite speaker combination to achieve or approach full-range performance.)

Currently, you'll find digital AC-3 soundtracks only on laserdisc titles; check the fine print on the back of a disc's jacket to determine whether it includes the AC-3 data. The multichannel digital data occupies one channel's worth of an LD's *analog* audio-track "real estate" (AC-3-encoded discs de-

NEW AC-3 GEAR

IN ORDER TO ENJOY THE BENEFITS OF DOLBY SURROUND AC-3 DIGITAL SURROUND sound, you need a compatible laserdisc player and demodulator/decoder, and manufacturers will be rolling out both over the next few months.

Denon, which delivered their LA-2300 AC-3-ready LD combi-player (\$700) in July, will offer the AVP-8000 preamp/tuner/AC-3 decoder (\$3,500, scheduled to appear in stores in "early fall"). The AVP-8000 is the first AC-3 component to receive THX certification for both its AC-3 and Dolby Pro Logic decoders.

Pioneer added five AC-3 components to the four AC-3-equipped LD players they introduced last spring. The VSX-99 A/V receiver (\$2,100, August) incorporates AC-3 and Dolby Pro Logic decoders and is equipped with both an AC-3 RF input and a demodulator. The SP-99D (\$1,530, August) is a standalone AC-3 demodulator/decoder with eight discrete analog-audio outputs. A trio of AC-3-ready LD combi-players closes out the quintet: The CLD-99 (\$2,400, July), CLD-79 (\$1,440, June), and CLD-59 (\$900, June) all belong to the company's Elite high-end line.

Yamaha says their DDP-1 AC-3 demodulator/decoder (\$599) will be in stores in September. You can plug the DDP-1's six outputs into the six inputs on the company's RX-V2090 A/V receiver (\$1,499), which features a digital Dolby Pro Logic decoder and seven channels of power amplification. Yamaha's CDV-W901 AC-3-ready LD combi-player (\$899) was due to hit in August.

Most major A/V manufacturers say that they'll release at least some AC-3 gear early in 1996. At that point, Denon, Pioneer, and Yamaha may already be working on more affordable second-generation units.

—Chuck Tannert



Pioneer's VSX-99 is the first AC-3-equipped A/V receiver

liver only mono analog sound, but they do deliver normal stereo—Dolby Surround-encoded, usually—on the 16-bit digital track). AC-3 will be incorporated into the United States' high-definition television (HDTV) system, which is now scheduled to arrive sometime in 1997 [see "Fast Forward," page 14]. And AC-3 will probably turn up on direct-broadcast satellite (DBS) systems; PrimeStar has committed to the format, though DSS hadn't at presstime. Digital videodiscs (DVDs) are another likely candidate.

In addition to an AC-3-encoded LD, you'll need three technology items: An AC-3-ready LD player, an AC-3 demodulator, and an AC-3 decoder/surround-sound processor. AC-3-ready LD players include a special radio-frequency (RF) output jack that carries the entire stream of digital audio/video signals, including the AC-3 bits (the RF connector on non-AC-3 players, conversely, provides *analog* A/V signals combined into a standard TV-antenna signal, and don't have anything to do with the digital AC-3 data stream; see "Upgrading LD for AC-3," page 39).

The demodulator, which is most often built into the decoder/processor but also may be found in the LD player or in a separate chassis, extracts the AC-3 bit stream from this signal and diverts it to the AC-3 decoder. The decoder, which can be a standalone product or incorporated into an A/V receiver or some other type of home-theater controller, splits the AC-3 bit stream into six channels of audio, converts each digital channel into an analog signal, and sends the analog signals through its outputs to six independent channels of power amplification. The amplifying goods could be, say, a five-channel A/V receiver plus a powered subwoofer or any appropriate combination of mono, stereo, and/or multichannel power amplifiers. One thing to keep in mind regarding power amplification: Since all but the sixth AC-3 channel will be full-range (unless you decide otherwise), each channel needs to be powered by an amp that can drive full-range signals without lagging behind the system's other amps.

THE REFERENCE SYSTEM

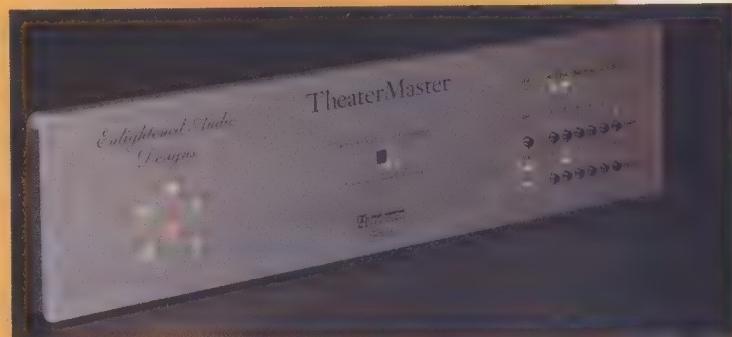
For my initial AC-3 experience I assembled a highly capable system based around EAD's TheaterMaster, which delivers AC-3 decoding via Zoran's ZR38000PQC chip—the first and, so

ENLIGHTENED AC-3

ENLIGHTENED AUDIO DESIGNS' THEATERMASTER (\$6,995) IS EVERY BIT AS imposing as its name. The sumptuously finished, all-pushbutton component combines surround decoding (AC-3, Pro Logic, and matrix-stereo modes) with sophisticated digital-to-analog conversion, high-end analog circuitry, and flexible, though audio-only, options for digital and analog inputs and switching.

Inside the TheaterMaster is a Zoran ZR38000PQC chip, which performs AC-3 surround decoding as well as digital-domain Pro Logic decoding. Digital-to-analog conversion is handled by "hand-matched" dual-differential Burr-Brown 20-bit chips. The unit also incorporates an anti-jitter circuit to stabilize incoming digital streams. And then there's the specialized chip from Pacific Microsonics for enhanced stereo playback of HDCDs [see "High Flying," "Fast Forward," July/August 1995] and CDs.

The TheaterMaster accepts either an analog stereo or a digital signal from up to six audio sources. Among the six digital inputs, the first is in the audiophile-preferred glass-fiber ST format, inputs two through five are conventional 75-ohm S/P-DIF coaxials, and the sixth one is a TosLink optical port. An extremely flexible monitor/dubbing setup lets you route analog as well as digital audio signals to your



Esoteric, and built to stay that way

heart's content; the setup process is complex, but the options are uncommonly generous. The TheaterMaster's analog outputs include front left, center, and right, left and right surround, and line-level RCA-jack subwoofer outputs.

Virtually any speaker system can be accommodated thanks to the TheaterMaster's extremely flexible array of active crossovers. You can detour the deep bass intended for any speaker over to the subwoofer, and you can pick the frequency at which the detour begins; Dolby mandates this arrangement, though not quite as flexibly, for all AC-3-decoding products. And EAD goes further, endowing the TheaterMaster with independent control over which speakers are rolled off (in the digital domain) and which are crossed over. Only one crossover frequency can be programmed for all speakers, however.

The TheaterMaster's user interface is compact and effective (the remote control is a metalworker's *objet d'art*), but it's exceedingly difficult and obscure, requiring arcane key-sequences, "double-clicks" of critical buttons, and an elephant's memory (or constant reference to the none-too-clear owner's manual). Worse, there's no real display to speak of (just a cluster of cryptic front-panel LEDs), so you're responsible for keeping track of modes and volume settings yourself.

The payoff is performance. During critical music listening, the TheaterMaster delivered truly top-shelf sound in the two-channel mode as well as all surround modes. As a D/A converter/digital preamp, and on sonic grounds, it should compete effectively with just about anything out there.

—DK

far, only AC-3 chip available. (At least a half-dozen big chip houses are busily developing rivals.) [For more on the TheaterMaster, see "Enlightened AC-3," above.]

The system also included an all-B&W speaker suite: Full-range floor-standing Matrix 803 Series 2s served the left and right channels both front

and rear. An HTM center-channel speaker, which kicks out solid response down to about 60 Hz, sat atop the monitor. And a single, massive, corner-located Model 800ASW 12-inch powered subwoofer [see "VIDEO Tests," June 1995] handled the bottom two octaves. Power was provided by Acurus and Adcom power amplifiers, to the tune of

100-plus watts to each of the five full-range channels; B&W rates the 800-ASW's built-in amplifier at 200 watts.

Before I wired up the TheaterMaster, I tuned up this reference system with my normal Pro Logic processor. After a good deal of trial and error, I positioned the surround-channel 803s just slightly behind and well to either side of the primary listening position and aimed them toward the rear wall. (This yielded the most enveloping and least intrusive surround-channel Pro Logic sound; remember, the 803s are full-range floor-standing models.)

Then I wired up the TheaterMaster, adjusted output levels, and determined crossover settings (the TheaterMaster includes a mic and front-panel readouts for channel-balancing). After several hours of experimenting with various setups, I ultimately settled on running the surround 803s full-range and siphoned bass content below 60 Hz from each of the three front speakers off to the subwoofer. This unconventional layout did the best job of reproducing low and midbass frequencies. At this juncture, the system sounded terrific: clean, ultra dynamic, open, and smooth, with superior imaging and huge yet well defined bass.

I needed an AC-3-ready LD player to spin AC-3-encoded LDs, of course, so I also wired up EAD's T-8000 Series III Universal Disc Transport (\$3,950), an LD/CD transport that includes the special AC-3 RF output. A prototype EAD demodulator received the T-8000's RF output via a prototype adaptor. (EAD says that, by the time you read this, they'll be supplying their SmartCable adaptor, which has the AC-3 demodulation circuitry built-in, with each TheaterMaster.) AC-3-encoded LDs included *Clear and Present Danger*, *Stargate*, and *True Lies*.

Before plunging into comparisons of AC-3 and Pro Logic, I should point out that, on LDs (and any future format), the AC-3 soundtrack and the Pro Logic soundtrack are *totally different mixes* created by the movie's sound-production team. This is crucial: While the mixing team uses one six-track master to make both mixes, the 5.1-channel digital track is a unique mix that's made at the end of the process of assembling the soundtrack. With the AC-3 mix, the production team works with the fully discrete surround channels, the separate low-frequency effects (subwoofer) channel, and all of the

changes in directionality, tonal balance, and sound-effects handling that these allow—and that aren't available with standard Dolby Surround/Dolby Pro Logic. This means that an AC-3-versus-Pro Logic comparison isn't an apples-to-apples affair, though it isn't apples-to-oranges, either. It is, well, apples-to-pears. Everything else in my reference system, however, remained the same—same LD transport, same D/A conversion, same power amplification, same levels, same speakers and speaker positioning, and same program

AC-3 performs tricks you have never heard before, simply because DPL can't produce them.

material. I should also add that my evaluation reflects only one particular system, albeit a very fine one, working with a truly high-end decoder/processor and precisely three LD titles. In short, any sweeping comments I make should be read in this context.

Finally, when I switched from AC-3 mode to Pro Logic, the DPL decoding was accomplished by the TheaterMaster's Zoran chip, which handles DPL in the digital domain. Pro Logic decoding will be built into every AC-3 decoder—■ mandate by Dolby, to insure backward-compatibility. In other words, if you buy a component that offers AC-3 decoding, you'll also be able to use it to enjoy DPL surround sound with programs that only have Dolby Surround soundtracks.

CUT TO THE CHASE

Does TheaterMaster-driven AC-3 sound different than Pro Logic? You bet it does. And, in most cases, the difference isn't particularly subtle. AC-3 sounded clearer, cleaner, and more dynamic, with frequent bottom-octave advantages and a dramatically different sense of space and ambience. Even with the simplest of scenes—one character talking in an ordinary room, for example—the sound was better focused and more stable, almost as if a scrim had been removed from the sound. On many big, complex scenes, the difference was nothing short of astonishing.

The big news has to be AC-3's discrete surround channels. Pretty much everything you need to know can be gleaned by cuing *Clear and Present Danger* to the 13'06" mark of Side 1 (Chapter 2): The camera pans across the house owned by Jack Ryan (Harrison Ford), and a robin chirps somewhere off-screen. In DPL, the chirps have a nice sense of outdoor ambience, but you can't really tell where the bird is—it's somewhere, to be sure, but that somewhere could be anywhere. With AC-3, the robin was located precisely mid-right rear, just off-screen, and its exact positioning didn't come at the expense of natural, open-air ambience. The effect was so convincing, in fact, that the first time I AC-3'd this segment (on a balmy day, with the windows open), I thought it was a real robin nesting in the lilac bush outside.

More dramatically, a *Stargate* sequence (at the 28'43" mark of Side 2, Chapter 4) produces a trick you've never heard before, because Pro Logic simply can't perform it. One of the airborne guards (surplus flying monkeys from Oz?) flies screen-right-to-center and off into the distance, and the jet roar of his apparatus follows. The sound commences far-rear/hard-right and pans smoothly forward and center, disappearing into the behind-the-screen distance—pretty amazing, and a real head-snapper if you're paying attention. With DPL, all you hear is a generalized rear-to-front pan, and it's not nearly as convincing—or exciting.

One illuminating AC-3 trial is to listen to the surround channels alone (by unplugging the left, center, and right speakers as well as the sub). If you do this with a Pro Logic system, it isn't very pretty: You end up with essentially AM-radio bandwidth that's noisy, pumping, and usually kind of dirty. But the AC-3 surrounds were squeaky-clean and almost dead quiet—still ambient and vague much of the time (a function of a film's recording/mixing process), but almost entirely free of noise or the audible artifacts (such as pumping, fading, or fluttering) you typically get with matrix surrounds. More important, perhaps, the AC-3 system was completely free from dialogue "leakage," since it's an inescapable artifact (in varying degrees) of matrix encoding and decoding, which isn't employed here. And there's deep bass galore.

I also noticed that ambience repro-

duced in the AC-3 mode frequently sounded dramatically different than it did in the Pro Logic mode. In *Stargate*'s feast scene (at the 0'04" mark of Side 2, Chapter 1), for example, the sense of acoustic space was completely different with AC-3: brighter, of course (DPL's surround channels are intentionally cut off at 7,000 Hz), but also palpably more open and lively. And ambient, off-screen sounds had noticeably more detail.

If you're not convinced that the AC-3 and DPL mixes are entirely different, check out the 17'15" mark on Side 1 (Chapter 4) of *Stargate*: On the AC-3 track, there's a strong, fairly deep and definitely ominous rumble emanating from a tunnel. In Pro Logic mode, the rumble is entirely absent; for whatever reason, the film's sound mixers simply didn't put it in the DPL mix.

I reveled in these sorts of special effects with each of the three AC-3 discs. And while they certainly turned my head, delivering a large measure of the gee-whizzy I'd expected from multi-channel digital sound, they weren't what I found most compelling about my initial AC-3 encounter. What jazzed me the most was simple dialogue. Anyone who's had a top-flight, LD-equipped home theater for a few years knows that the dialogue on a real-

ly well produced Dolby Surround soundtrack sounds superbly clear and intelligible. But you'll have to redefine your notion of clarity and intelligibility once you've heard AC-3. With the TheaterMaster in AC-3 mode, the dialogue on my three discs simply sounded clearer and more natural under direct comparison to the TM's Pro Logic mode. This change, which was true on virtually every scene incorporating central dialogue, may seem subtle to casual movie fans, but if you've passed many an hour with three ears cocked toward a DPL system, it'll be a revelation. AC-3 dialogue was virtually free of the slightly muffled, vaguely cupped sound that I've noticed with almost all DPL dialogue. Equally absent were the occasional pumping, unexpected volume shifts, and unintentional dialogue leakage you often get with DPL.

Only once did AC-3 falter . . . or so I thought. In the sniper-range scene from *Clear and Present Danger* (the 26'29" mark of Side 1, Chapter 6), the voice of the sergeant major who's positioned atop the truck ("Stop—touch that light-colored grass. . .") sounded very natural in DPL, but, with AC-3, the voice suddenly sounded like it wasn't precisely outdoors anymore: The soldier sounded a little like an actor dubbing dialogue in a studio—there's a very

subtle room sound and a trace of reverb to his voice. I ultimately chalked this up to AC-3's enhanced transparency: Flaws in the soundtrack were magnified by AC-3's superior resolution—similar to the way a high-quality phono cartridge accentuates the scratches and pops in an old beat-up vinyl record.

THE BOTTOM LINE

Clearly, AC-3 is an extremely powerful tool in the moviemaker's arsenal. As was painfully true with the music CD, however, new tools take some getting used to. Though I expect a much quicker transition with AC-3—many filmmakers have had a head start, since they've been working with theatrical Dolby Digital, DTS, and other 5.1-channel digital formats for the last few years—there will be a transition period nonetheless. In part, this will consist of jettisoning those Pro Logic production habits that evolved to compensate for the matrix system's hard-and-fast limitations. It will also require the conjuring of new effects that Pro Logic simply can't reproduce.

True Lies, for example, sounded appreciably different with AC-3 than it did with DPL: at once less bright and less bottom-heavy (and with a decidedly lower relative center-channel level),

CONTINUED ON PAGE 96

UPGRADING LD FOR AC-3

Matt Dever, Pioneer's audio brand manager, points out that the upgrade may not always make sense: "For owners of lower-end machines, we strongly suggest upgrading to the more modern technology. With some higher-end machines—such as our CLD-97, which costs our customers \$2,500—the upgrade may be a sound alternative."

MSBT's Gullman agrees: "It really doesn't pay to put an output of this quality on a cheap player. We don't get many \$300 to \$400 players [for the upgrade]."

Dever emphasizes that the upgrade-minded must find a competent service center to do the job. "We're not doing [the retrofit ourselves]," he says, echoing a sentiment shared by many of the other LD-player manufacturers. "But there are companies out there who are. Just make sure they're a qualified aftermarket service center. And do not try attempting it yourself at home."

Again, Gullman agrees: "This up-

grade takes a certain amount of expertise. You need to know the inner workings of an LD player and the retrofit procedure or you run the risk of killing the player." MSBT, he adds, has an impressive résumé: "We manufacture Runcor's LJRII, which was the world's first AC-3-ready LD player. We know what we're doing because we've been in it longer than anybody else."

Spokesmen from Denon, Marantz, Panasonic, Theta Digital, and Zenith agree with Pioneer's Matt Dever, urging caution and noting the importance of finding a qualified service center. Because the quandary is a new one, other manufacturers are still pondering the upgrade question and haven't taken an official stance.

At least one manufacturer is going against the grain. McIntosh has pledged to upgrade their MLD 7020 LD combi-player (\$3,200) for any customer who wants the retrofit, at no charge.

—Chuck Tannert

LASERDISC PLAYERS NEED A SPECIAL RF output in order to convey AC-3's digital bit stream from a laserdisc to the next stop in the signal chain of an AC-3-ready home theater. Virtually all new LD players will have this type of output (in addition to the standard varieties), while older players that lack it can be retrofitted.

MSB Technology (415.747.0271) is one outfit that retrofits LD players with RF outputs. Larry Gullman, MSBT's general manager, says they've been doing AC-3 upgrades for some time: "We just go in and install a little output board and an RF connector." MSBT charges \$385 for the upgrade; LD owners also have to pay for one-way shipping and any insurance.

Most manufacturers of LD players don't recommend the retrofit. They note, quite correctly, that it voids the player's warranty and its FCC certification; others warn that an incompetent upgrader could damage the player.

Acurus Rated Number One

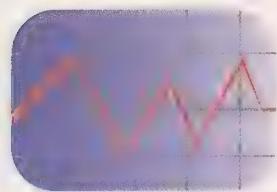
ACURUS VS THEM

In a twelve amplifier comparison test Video Magazine ranked the Acurus A150 amplifier number one. The Acurus received an A grade in both Sound Quality and Construction! "More importantly, this amp delivered tons of punch—significantly more than I expected from a '150-watt' amp. The sound had outstanding dynamic outlines and impact, trap drums and big bass events were impressively rendered. There was also an open, highly detailed, but never harsh character to the sound, with notable depth and 'space'." — *Dan Kumin, Video Magazine*



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Wide World

Pioneer's SD-P6081 delivers 60 wide inches on a thin budget



IT'S GETTING MORE DIFFICULT BY THE DAY TO CHOOSE A big-screen television. Consider that, for about \$3,000, you can buy a topnotch 32- or 35-inch direct-view set or a variety of rear-projection models. Most of the rear-projectors are in the 40- to 50-inch category, but Pioneer has upped the ante on the screen-size front: Their SD-P6081, which is tagged with a retail price of \$3,199, has a positively huge 60-inch screen and a widescreen aspect ratio. If you can fit a 60-inch set in your home, it's a sight to behold.

The P6081 has the largest screen that Pioneer, a heavyweight in the rear-projector arena, has ever produced. It's also the most affordable 60-inch model in the company's four-tiered projector line. While the P6081 shares screen size with those other projectors, it cuts back on some of their features and picture tweaks in order to bring the price down. The set weighs 300 pounds, but rolls easily on its supplied casters. It measures 56.3 x 56.3 x 26.5 inches (h/w/d).

Pioneer's approach to big-screen television is unique in that all of their

projection sets incorporate a wide-screen aspect ratio that they call the Cinema Wide System. Instead of using the 16:9 aspect ratio used by all other manufacturers of widescreen sets, Pioneer builds sets to the slightly taller ratio of 16:10.7, which translates out to 1.77:1 in the film world (movies generally have aspect ratios ranging from 1.33:1 to 2.35:1). Pioneer chose the 16:10.7 ratio because they feel that it's the best compromise for people who want to enjoy the big-screen experience with widescreen movies, but know that most of their viewing will be of standard 4:3 TV shows. Special cir-

cuitry built into Pioneer's 16:10.7 sets (including the P6081) expands any 4:3 image to fill the wider screen; the sets' extra 1.7 inches in picture height keeps an expanded image from appearing distorted.

As mentioned, the P6081 goes light on features. It employs a single tuner, so a VCR is needed for the set's standard PIP functions. The CHANNEL RETURN feature lets you quickly flip between the currently tuned channel and the previously tuned channel, while A/V MEMORY stores up to four separate groups of picture-control settings—two (STANDARD and GAME) are factory preset and two (AV1 and AV2) can be customized.

The set's inputs are limited to two antenna inputs and two audio/video inputs, labeled LD and VIDEO, respectively. There's no S-Video input, and there's only one set of audio outputs.

The P6081 utilizes 7-inch CRTs with short-focus hybrid glass-and-plastic lenses in conjunction with an SLD (Surface Layer Diffusion) screen. This

combination is designed to do a superior job of transmitting color and brightness to the viewer.

The remote is pretty basic; it doesn't have the ability to control other components. Its unusually small size results in extremely small buttons, which makes it difficult to use, especially in the dark.

Operation is straightforward: A small, basic bar graph runs along the bottom of the picture, offering access to MTS (audio), CLOSED CAPTION, PIP, SETUP, PICTURE, and A/V MEMORY menus. You can highlight a menu by clicking over to it with the remote's arrow keys and hitting its ENTER button. PICTURE MENU offers COLOR, TINT, CONTRAST, BRIGHTNESS, and SHARPNESS adjustments.

As is the case with most rear-projectors, the P6081 comes out of the box with its picture controls set too high. The *A Video Standard* test disc indicated that BRIGHTNESS (black-level) and CONTRAST (white-level) were set way too high, and colors weren't quite right either. My color analyzer indicated that color temperature measured 10,800 degrees Kelvin at both ends of the gray scale, with a peak light output of 29 footlamberts.

Using AVS, I set BRIGHTNESS to two notches below the middle of its graphic, CONTRAST to eight notches below its midpoint (resulting in a very acceptable 15.5 footlamberts), SHARPNESS to halfway between its one-quarter mark, TINT to eight notches below its midpoint, and COLOR to 15 notches below its midpoint. Even after notching COLOR down, the reds produced by my test

sample were quite hot, indicating that its decoder was allowing slight oversaturation.

I did notice that all three colors (red, green, and blue) were bleeding considerably at the top-center of the screen, particularly obvious with widescreen laserdisks, and at the top-right with full-screen images. A Pioneer field technician was able to fix the problem by making a small adjustment to the image's sizing. Problems like this are typically fixed through minor adjustments on the assembly line.

The P6081 showed good convergence out of the box and needed only minor tweaking. The set gives consumers more control over convergence than any rear projector I've encountered. There's a nine-point static convergence system, which lets you properly align the images from the red, green, and blue lenses on top of one another at eight points along the edge of the screen as well as at the common center point. Though it's not well explained in the manual, the process is fairly simple once you get used to it, and it results in a much more clearly focused image when properly done.

At this point, the P6081 delivered a fairly sharp, crisp picture with good (though not perfectly accurate) color rendition. My test sample still exhibited more background noise (visible with test patterns and in various scenes from my reference discs) than I would've liked, however. On a resolution chart, I observed 410 lines of horizontal resolution and 500 lines of vertical resolution. Detail was quite good.

BY THE NUMBERS

Measurements by Berger-Braithwaite Labs

Horizontal resolution: 410 lines

Picture S/N: video, 56.3 dB; chroma AM, 64.4 dB; chroma PM, 64.1 dB

Screen brightness: before calibration, 29 footlamberts; after calibration, 15.5 footlamberts

Color temperature: before calibration, 10,800 degrees K; after calibration, 6,550 degrees K

The P6081 can be professionally calibrated. Color temperature on the top of the gray scale measured 6,550 degrees Kelvin after calibration (the standard is D6,500 degrees K) with a peak light output of 15.5 footlamberts, and the bottom of the scale read 6,300 degrees K. The P6081 was very linear through its output range. Most projectors (front or rear) develop a hump in the middle of the gray scale; the P6081 had the stable, rock-solid gray-scale tracking of a good direct-view set. Calibration—of the blue tube, specifically—also reduced some of the noise I'd noticed. And color rendition was very good, with natural flesh tones.

Pioneer says that the P6081 delivers a wide horizontal viewing angle, and the set lives up to this claim. It's much less forgiving of movement in the vertical plane, however, suffering sizable reductions in picture brightness and clarity if you move your head above or below the screen's midpoint. To be fair, this is the case with most rear-projectors.

The set's sound system—two 3-inch speakers and a 3-watt-per-channel power amp—was perfectly adequate for basic TV viewing. Pioneer clearly didn't try to give it the kind of impact the set's picture has, of course, so you should definitely connect the P6081 to a full surround-sound system for serious viewing. Sixty inches of screen size deserves nothing less.

THE SD-P6081 MAKES TRULY HUGE images relatively affordable. As with any television, you should consider its out-of-the-box picture a palette with which to work. Careful adjustment with *A Video Standard* improves the picture in most regards, and, as always, I recommend professional calibration. Properly adjusted, the P6081 delivers a picture that competes well with any rear-projection TV. If you're looking for the biggest screen for the buck, this is one set you must see.

THE SHORT FORM

PIONEER SD-P6081

Component type: 60-inch widescreen rear-projection TV

Price: \$3,199

Target: Videophiles, movie buffs, and serious home-theater enthusiasts

Minimum requirements*: Hi-Fi VCR, A/V receiver, main, center, and surround speakers

KEY FEATURES

- 60-inch screen ■ 16:10.7 aspect ratio ■ Two A/V inputs ■ Stores four groups of picture settings ■ Nine-point adjustment for convergence
 - One TV tuner ■ Standard PIP functions ■ 7-inch CRTs with short-focus hybrid lenses ■ Can be professionally calibrated for 6,500-degree color temperature ■ Remote control

SUMMARY

- No-frills package ■ Operation is straightforward ■ The convergence system is extremely flexible ■ A huge picture for a reasonable price

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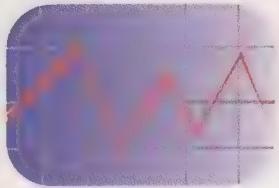
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VIDEOTEST

Pro Found

**Meet the Model 35190,
ProScan's flagship
35-inch direct-view TV**



PROSCAN, THE HIGHER-END LINE FROM THOMSON (PARENT company of RCA and GE), has earned a fine reputation for building high-quality direct-view and rear-projection televisions over the years. The line is generally loaded

with Thomson's most sophisticated circuitry as well as their newest user and convenience features. The Model 35190 35-inch TV is ProScan's new flagship direct-view. ♦ The 35190 (\$3,199) is a monster, measuring 32.75 x 35 x 24.36 inches (h/w/d) and weighing

in at a hefty 186 pounds. Cosmetically, it continues in the ProScan tradition, with a matte charcoal-gray facade and soft edges. Across the front are the requisite controls for power, menu, channel up/down, and volume plus headphone and A/V jacks. The A/V jack is a mini-phone type and requires the supplied, easy-to-use adaptor to accept video and mono audio.

The back panel features the set's connections. There are three A/V inputs (two include S-Video options) plus two antenna inputs, for a true antenna and/or cable. The manual notes that the second antenna input can be used for

plugging in a videogame console.

On the output side, a bridged output from INPUT 1 channels video, S-Video, and fixed-volume audio. There's also a fixed-volume A/V output that works with all of the TV inputs, a TV tuner output for looping through to an A/V receiver with a remote control, and an audio output for the channel playing in a PIP.

Volume-controlled line-level audio outputs (via RCA jacks) are on hand for routing left, center, right, and surround channels from the 35190's built-in Dolby Pro Logic decoder to separate multichannel amplification (and then to

main, center, and surround speakers). There are also speaker-terminal connectors for the main, center, and surround channels (in case you want to use the 35190's DPL decoder and amp, but not its speakers), with slide switches for choosing between the internal and external setups. A five-pin mini-DIN output jack is on hand to feed the bass module that extends across the top of the set's back; the cable that links the jack and the module is supplied.

Thomson has given the 35190 a new graphic interface, whose goal is to make the set easier and more fun to use. The interface presents a cartoon drawing of a living room, complete with the TV, speakers, a sofa, a coffee table with the set's remote control, a clock, and the RCA mascot Nipper, who sits and wags his tail, ready with an ASSISTANCE menu.

Each item in the display represents a specific component or group of functions. You navigate among them by using one of the two remotes supplied with the 35190 (more on them in a bit).



BY PETER BARRY

and an on-screen cursor. You move the cursor by pressing the remote's MOVE arrows; when you've positioned the cursor on the item you want to work with, hitting the remote's MENU button accesses the item's options.

Clicking on the speakers, for example, brings up the audio menu, with choices for speaker setup, a seven-band graphic equalizer (with bands centered at 60, 150, 400, 1,000, 2,000, 4,500, and 10,000 Hz and ±14-dB boost/cut action), and audio processing options (including DOLBY 3, PRO LOGIC, PRO LOGIC PHANTOM, MATRIX, and HALL SURROUND). The SOUND CHECK option runs white noise through each speaker in turn to help you balance sound levels. And VOLUME LIMIT lets you set the maximum output level for the set.

If you click on the front panel of the cartoon TV, you'll get to the PICTURE QUALITY menu. It offers all of the usual suspects in the picture-control department plus on/off settings for the AUTO COLOR circuitry, VID(eo) NOISE FILTER, and THEATRE mode (which switches the 35190 to a group of picture-control settings that Thomson feels is suitable for viewing in a darkened room). The 35190 also offers three COLOR WARMTH settings: COOL, NORMAL, and WARM.

Clicking on the cartoon TV's edge accesses the SCREEN menu, which lets you set up the PIP function, choose SPLIT SCREEN (which presents two pictures side by side), or select POP (picture-outside-picture), which superimposes three secondary channels down

the right side of the main image, in what's referred to as "simulated motion." The SCREEN menu also offers a CHANNEL GUIDE option, which fills the screen with images from 12 user-selected channels. These channels can be picked from the set's full tuning range or the user-defined FAVORITE channel group.

You may like the cartoon graphics, but I wasn't crazy about them. The main menu can be shifted from the cartoon graphic to a more traditional text menu, however. There are four options for the background color of the menus, and the clock display can take analog or digital form. Using either type of

The PIP-anchored SKIP function provides an escape from an endless sea of commercials.

menu is too involved, however. Getting to, say, the 35190's color-temperature settings requires a menu click, three clicks to reach the PICTURE QUALITY menu, another menu click, eight clicks down to COLOR WARMTH, then another click or two to change the setting. That's a minimum of 13 clicks—and if you want to compare the three color-temp settings, we're up to 39 clicks.

THE SHORT FORM

PROSCAN MODEL 35190

Component type: 35-inch direct-view TV set

Price: \$3,199

Target: Videophiles, movie buffs, and serious home-theater enthusiasts
Minimum requirements*: Hi-Fi VCR, A/V receiver, main, center, and surround speakers

KEY FEATURES

- Dolby Pro Logic decoding ■ Graphical on-screen interface ■ Dual-tuner PIP with advanced functions ■ Innovative FETCH function ■ Commercial-skip function ■ Channel lock ■ Two remotes (one universal)
- Digital comb filter ■ Three color-temperature settings ■ Built-in center-channel speaker, external bass module

SUMMARY

- A generous complement of features and connections ■ Lots of image detail and low video noise ■ Very good comb filter ■ Good sound system
- Can be professionally calibrated for 6,500-degree color temperature ■ Delivers solid 35-inch performance

Circle 101 on reader service card

*To maximize its potential

BY THE NUMBERS

Measurements by Berger-Braithwaite Labs

Horizontal resolution: 410 lines

Picture S/N: luminance, 54.7 dB; video, 54.2 dB; chroma AM, 63.8 dB; chroma PM, 63.5 dB

Screen brightness: before calibration, 112 footlamberts; after calibration, 28.1 footlamberts

Color temperature (COOL setting): before calibration, 9,750 degrees K; after calibration, 6,610 degrees K

More direct access to functions would speed things up.

As mentioned, the 35190 is supplied with two remote controls—a simple remote and a universal learning remote. The simple remote can control the TV and can be programmed to control most VCRs. It has all of the necessities, providing power, volume, channel, and menu in TV mode and standard VCR controls in VCR mode.

The universal remote can be programmed to control other TVs, VCRs, cable boxes, a satellite receiver (including, naturally, a DSS package), a laserdisc player, and an A/V receiver or CD player. Considering its many abilities, this remote is fairly well laid out, though the buttons are small and can be difficult to locate (make that impossible when you're in a dark room).

The universal remote accesses some unusual features that deserve mention. The SKIP function allows you to skip commercials without missing a moment of the program you were watching: Hit the SKIP button once and the PIP window appears, along with a 30-second timer (repeated presses increase the timer's display by 30-second increments). You can scan channels in the main screen while the PIP holds the original channel; when the timer runs out, the PIP disappears and you resume watching the original channel. The audio stays with the main screen. Since it's tough to determine precisely how long a commercial break will run, the best idea may be to stick with the 30-second interval and just hit SKIP again if another commercial pops up.

The FETCH function provides at least a partial answer for my "slow-menu" gripe: It holds a maximum of five frequently used functions. It comes preset with SLEEP TIMER, AUDIO PROCESSOR, CONTRAST, and CLOSED-CAPTION; one more can be added to this group, and any or all of them can be replaced with

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functions from other menus.

The PIX+ function, which encompasses the PIP and POP functions, is very sophisticated. The PIP window can take one of five sizes, and it can be moved around the screen. The main image or a PIP image can be still-framed via the universal remote's FREEZE button, and the PIP window can be used to scan channels. You can use the SKIP and SCAN buttons to channel-graze during commercials. Hit the SKIP button and the PIP window appears; then hit SCAN and the main image will scan through all of the channels in the tuning range until the commercial timer expires and your original station returns to the main image.

The 35190 features an FDT (flatter, darker tube) Invar picture tube. The tube's Invar shadow mask is said to allow the set to sustain high brightness levels. There's also a digital comb filter and HP scan velocity modulation.

On the audio side, the set has left and right speakers, a built-in center-channel speaker, and that external bass module, which sits on top of the rear cabinet. As mentioned, the set includes multi-channel amplification and a surround-sound processor that features Dolby Pro Logic decoding.

Straight out of the box, the picture presented by our test sample (a pre-production model) was very bright and also very blue; colors were very saturated, and reds were blooming. Switching from COOL to NORMAL to WARM in the COLOR WARMTH menu shifted the overall look from blue to red. Joined by VIDEO contributor (and TV calibrator) Kevin Miller, I looked at the 35190 with a color analyzer. The COOL setting had a color temperature of 9,750 degrees Kelvin and a light output of an extremely high 112 footlamberts, NORMAL measured 7,980 degrees K with 113 footlamberts, and WARM checked in at 6,400 degrees and 112 footlamberts; D6,500 degrees and 30 footlamberts are the NTSC standards for direct-view sets. Though WARM is extremely close to the NTSC standard in terms of temperature, in terms of color it's shifted extremely red, particularly at lower output levels (in other words, with dark scenes), and this is something that can't be adjusted out with the set's color controls.

I also noted a "peaking" problem, in which a vertical snaking line of varying intensity could be observed on-screen. I chalked this up to the test sample's

pre-production status. A call to ProScan determined that they'd already noted this and were taking steps to eradicate it.

Analysis with the *A Video Standard* test disc showed that the 35190 has a fairly well controlled power supply; and gray-scale delineation was good. The test disc enabled me to bring the picture controls in line: CONTRAST was set to its midpoint, BRIGHTNESS was set a click below its midpoint, COLOR was set just above its one-quarter mark, SHARPNESS was brought down below its one-quarter mark, and TINT was set to its midpoint. Once these adjustments were made, it became clear that the set's color decoder, like that in most other TVs, is set to give yellows a slightly orange cast. Detail on AVS's Multiburst pattern was good. I noted 410 lines of horizontal resolution and 500 lines of vertical resolution. Dot crawl was negligible, indicating that the digital comb filter was doing an excellent job.

At this point, the 35190 looked its best in the NORMAL mode: Plenty of image detail emerged, and images exhibited very little in the way of video noise. The picture was big and involving. Colors still bloomed a bit, but the overall effect was pleasing. Turning up the sound system with its external bass module really made for solid movie entertainment.

The 35190 can be calibrated. After calibration, I measured a color temperature of 6,610 degrees Kelvin and a light output of 28.4 footlamberts in COOL, 6,415 degrees K with 28 footlamberts in NORMAL, and 5,375 degrees K with 28.4 footlamberts in WARM (perfect for watching black-and-white movies). The set was extremely stable throughout the output range from high to low and delivered a very linear signal. Gray scale was now very well delineated.

PROSCAN'S MODEL 35190 OFFERS A huge number of amenities for a direct-view set. It's almost an instant home theater—simply wiring two surround speakers to the set's rear-panel speaker terminals will get you up and running with surround sound (though a screen this big cries out for more powerful, full-range sound). The 35190 also has a number of unique and interesting features, and it delivers a very satisfying picture. Give it a long look if you're shopping for a topnotch 35-incher. ■



In Control

**TEST
805**

ONE OF THE BEAUTIES OF HOME THEATER IS THAT YOU CAN configure things precisely the way you want them—if you don't mind making a few extra decisions, at any rate.

If, on the audio side, you want the compact convenience and centralization offered by an A/V receiver, but aren't satisfied with a receiver's power layout, you might be interested in teaming some form of "separate" amplification with a combination preamplifier/tuner/surround-sound processor. Marantz's AV600

makes this proposition *very* interesting.

Essentially an A/V receiver minus the amp circuits, the AV600 (\$1,199) combines inputs, outputs, and switching for video components, surround-decoding circuitry, traditional stereo preamp functions, and an AM/FM radio. You get plenty of connections, excellent signal-routing flexibility, and several surround modes, including Dolby Pro Logic and the THX enhancement of Pro Logic. In short, the AV600 represents the best of both worlds.

The AV600 is elegant and sleek, measuring about 4 x 17 x 14 inches (h/w/d). Most of its controls are located behind a front fold-down door. Features include the large blue display, the large volume knob, and pushbuttons for selecting sources and surround modes.

as well as muting and powering up the unit. There's a set of A/V inputs, including an S-Video port, keys for radio tuning and programming as well as A/V tape-dubbing, knobs for bass, treble, and input level, and a headphone jack.

Around back are four A/V input/output sets, including one set of outputs for flexible A/V tape-dubbing/recording. All of the video inputs and outputs are furnished in both composite (RCA jack) and S-Video (Y/C-discrete mini-DIN) formats. In addition, there are three audio-only inputs: CD plus two complete in/out tape loops. Line outputs are provided for main left and right, two centers, rear left and right, and two subwoofers. Two switches are on hand for setting center and subwoofer modes. The onboard active

Marantz's AV600 preamp/tuner/processor is far from powerless

crossover follows the THX standard, sending signals at 80 Hz and below to the sub outputs and rolling off the main and center speakers.

The rear panel also has a 25-pin connector marked PRE OUT: It accepts a special multiconductor cable, adopted as the THX multichannel standard, that carries line-level signals for all of the channels; you'd use them for one-cable hookup of a five-channel THX amplifier. The connector is actually a computer-style DB-25 jack—I'm not sure if its signal integrity would meet strict audiophile standards, due to its modest per-channel surface area.

There are AM/FM antenna inputs; a 75-ohm F-jack is the only way to connect an FM antenna. In addition, there are jacks for linking Marantz D-Bus-compatible components, allowing operation of the entire bunch by a single remote control. Lastly, the AV600 supplies two switched AC outlets.

Under-the-hood construction is tidy, and good-quality parts are in evidence. The AV600 employs a JRC Dolby Pro Logic decoding chip (in place of the various Analog Devices chips found in many of its peers) and draws from a hunkly-looking power supply.

BY DANIEL KUMIN

The learning remote features no fewer than 67 keys, which all happen to be identically sized and shaped, except for the master-volume up/down rocker. In short, it's functionally powerful, but ergonomically challenged.

I slid the AV600 into a high-grade home theater, and it quickly passed my first test: After I'd calibrated the main and surround channels in the THX-CINEMA mode, its relative channel levels stayed within 1 dB at any master volume setting. And Pro Logic performance was very good: The sound was well balanced, dialogue was excellently intelligible, and left/right and front/back pans were directed smoothly and accurately. Low-level detail was very good to excellent, and high-output peaks stayed clean and punchy. A bit of center-channel dialogue leaked to the left and right speakers, but it was extremely stable and free of sibilance.

The THX-CINEMA mode was equally fine, delivering the expected THX benefits of slightly smoother front-channel sound and a more open, more enveloping surround effect. I was also pleased to find that the THX setting sounded noticeably less metallic in the surround channels than many sub-\$2,000 THX processors I've evaluated. In all three movie modes, the AV600's front channels were extremely quiet, and its surrounds were only slightly noisier.

The AV600 also sounded fine in its stereo mode: dynamic, clean, and solid and defined at the low end. There was only the vaguest trace of the slightly

BY THE NUMBERS

Measurements by Start Labs

DPL channel separation (at 1,000 Hz): front left/front right, 52 dB; front right/front left, 51 dB; center/front left, 30 dB; center/front right, 29 dB; front left/center, 51 dB; center/front right, 44 dB; rear/center, 30 dB; center/rear left, 39 dB; center, rear right, 38 dB; rear/front left, 39 dB; rear/front right, 32 dB

DPL frequency response (referred to 1 watt): main, 20–20,000 Hz +0.5, -1.2 dB; center (LARGE/THX-CINEMA mode), 20–20,000 Hz +0, -1.4 dB; surround, 40–6,800 Hz +0, -3 dB; subwoofer, +3 dB at 10 Hz, -21 dB at 200 Hz

DPL THD plus noise (referred to 1,000 Hz with 1-volt input, input trim at detent): main, <0.08%, 20–20,000 Hz; center

(LARGE/THX-CINEMA mode), <0.02%, 20–20,000 Hz; surround, <0.8%, 100–7,000 Hz; subwoofer, <0.06%, 16–200 Hz

S/N (A-weighted, referred to 1 volt, volume at 0 dB, input trim at detent): stereo, 99 dB; DPL main, 94 dB; DPL center (LARGE/THX-CINEMA mode), 94 dB; DPL surround, 85 dB

DPL input overload (input trim at detent): main, 1.9 volts; center (LARGE/THX-CINEMA mode), 1.95 volts; surround, 1.45 volts

Video output: +0.2 dB

Picture S/N: unweighted video, 61.7 dB; weighted video, 62.4 dB; chroma AM, 75.5 dB; chroma PM, 49.9 dB

"squished," less transparent midrange sound that characterizes so many subaudiophile preamps. Its additional surround modes—MOVIE, HALL, and MATRIX—proved variously useful, and all sounded clean. (The MOVIE mode is simply DPL with the delay time of the surround channels adjustable up to a very long 90 milliseconds.) The AV600 also features a MONO mode, which forces everything to the center speaker (and subwoofer, if one is used); this is invaluable for mono TV and older mono-soundtrack films.

Video routed through the composite inputs and outputs yielded a signal that, though not absolutely pristine, maintained very good definition and freedom from video noise. Directly comparing LD still-frames with the AV600

in and out of the loop, I concluded that the preamp marginally increased video signal level for a slightly brighter picture. I also decided that looping video through the Marantz sacrificed a little sharpness and detail. For everyday use, though, the convenience of centralized A/V switching should outweigh this slight penalty for most users.

FM reception and sound were outstanding, ranking among the top three or four integrated tuners (that is, those built into a preamp or receiver) I've encountered in the last few years. AM reception was no better than run-of-the-mill by today's standards, which is to say mediocre to poor.

I wasn't very fond of the big, complex remote, but, once you grow accustomed to it, everyday ops are eminently doable. Using the remote to change master volume is tedious, though—rolling down from the 0-dB reference level to -20 dB took nearly 7 seconds. The mute key completely silences the system, which is handy—though it automatically disengages if you change sources. I also disliked being required to cycle through the surround modes to get to the one I wanted (to be fair, many processors and receivers work the same way). But for the most part, the AV600 proved intuitive and pleasant to use.

THE SHORT FORM

MARANTZ AV600

Component type: A/V preamp/tuner/surround processor

Price: \$1,199

Target: Serious home-theater enthusiasts

Minimum requirements*: 27-inch TV set, Hi-Fi VCR, five channels of amplification, main, center, and surround speakers

KEY FEATURES

- Dolby Pro Logic and THX-CINEMA surround modes ■ Two music modes
- Four A/V input/output sets (all with S-Video options) ■ Connections for two subwoofers ■ Three center-channel modes ■ Three subwoofer modes
- Active subwoofer crossover ■ On-screen menus ■ Front-panel composite and S-Video inputs ■ Remote control

SUMMARY

- Plenty of connections ■ Excellent signal-routing capability ■ Pro Logic and THX-CINEMA performance were excellent ■ Video signal pass-through maintained very good definition and freedom from noise ■ Excellent FM tuner
- An elegant, versatile, and high-performance package

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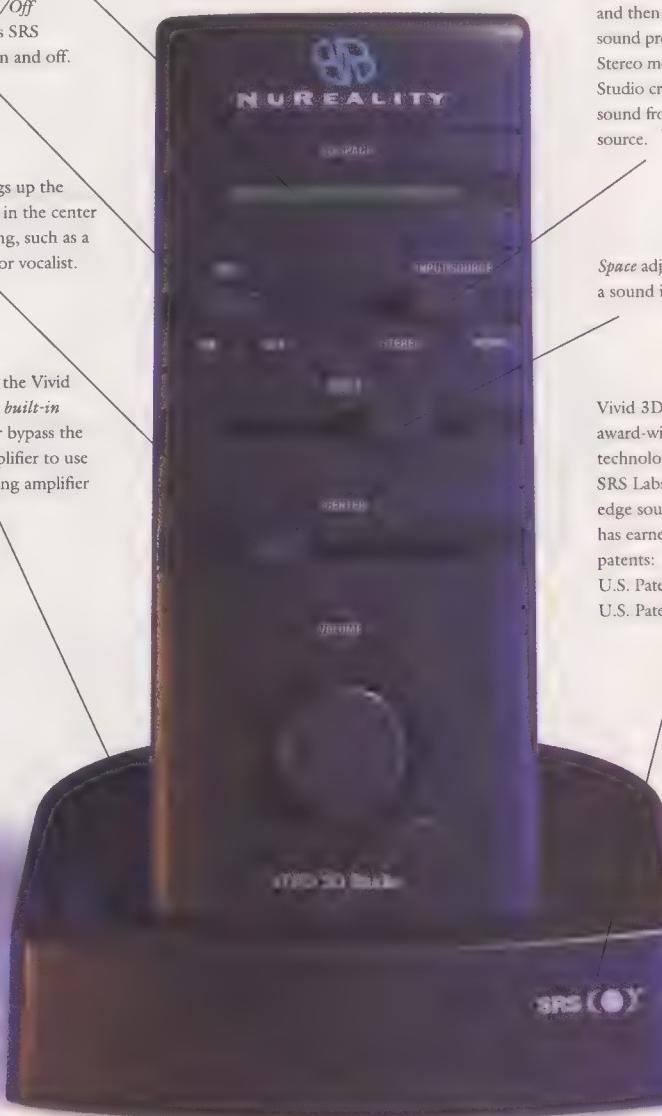
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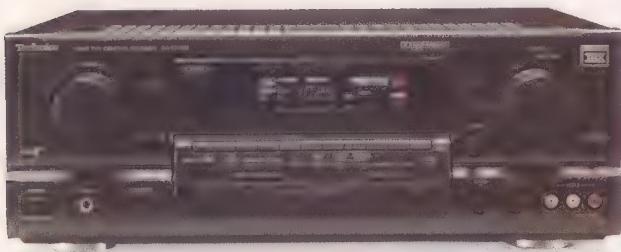
like magic ▶

Hitachi's Model 46UX20B (\$2,500), a 46-inch, 4:3 rear-projection TV in the Ultravision Series, is packed with clever features. Magic Focus is a digital convergence circuit that automatically reconverges the set in just 90 seconds. In addition to built-in left and right speakers, the set includes a built-in center-channel speaker and is supplied with a pair of wireless surround speakers. The 46UX20B has the slim profile of a 27-inch set, measuring 49.4 x 40 x 22.4 inches (h/w/d). The lens system is HDTV-ready and incorporates pure-red and pure-green lens filters as well as new RGB phosphors. Advanced PIP, a digital three-line comb filter, a Dolby Pro Logic decoder, and the Genius universal remote round out the package. *Circle 104 on reader service card*



◀ thx factor

Technics' SA-TX1010 A/V receiver (\$999) is currently the most affordable THX receiver you can buy. It delivers 120 watts to each front speaker as well as 60 watts to each rear speaker. The TX1010 includes Technics' well regarded Class H+ amplifier circuitry, which allows increased output from a conventionally sized chassis. Connections include four A/V inputs, two S-Video inputs, and a line-level subwoofer output. *Circle 105 on reader service card*



silent running ▶

Dwin's HD-500 projection monitor (\$12,000) sports 7-inch CRTs with color-corrected data-grade hybrid lenses and can produce images from 60 to 300 inches in a front- or rear-projection configuration. The projector should prove silent, since it doesn't employ onboard cooling fans. As a data-grade projector, it can support horizontal scan rates from 15.5 to 65 kHz and deliver NTSC video pictures, line-doubled or line-quadrupled images, or data-grade computer graphics with a pixel resolution of 1280 x 1024. A digital convergence system and seven test patterns are supplied, and the projector handles multiple aspect ratios. *Circle 106 on reader service card*



◀ hassle-free

3M's STV Digital 6 surround-sound system (\$600) seeks to deliver an exciting, hassle-free home-theater experience. The system includes a small surround processor/amp, five small, identical speakers for main, center, and surround duty, a small powered bass module, a remote control, and all of the wires needed to connect the system. Dolby Pro Logic decoding is built-in; 3M doesn't publish power specs for the amp or bass module. *Circle 107 on reader service card*

driving citation ▶

The Citation 7.0 A/V preamplifier/surround-sound processor (\$3,150) packs analog surround-sound circuitry designed by Jim Fosgate. Eight A/V inputs (including four S-Videos) offer big-system flexibility. The three front audio channels are completely analog. The 7.0 can calibrate input and output levels automatically. In addition to Dolby Pro Logic and Home THX surround modes, the SIX AXIS mode is said to deliver a phantom center channel in the rear of your room. Circle 108 on reader service card



cable control ▶

Mitsubishi's HS-U560 Hi-Fi VCR (\$599) simplifies recording setup by offering VCR Plus+ and Quick Program. It also handles cable channel changing; the supplied remote controls both the cable box and VCR. The PerfectTape system optimizes recording parameters for every tape you use. The U560 also employs the Center-Track four-head system, which features a hygienic automatic head cleaner. Circle 110 on reader service card



◀ power erupts

Velodyne's VA-1215X (\$999) powered subwoofer is the company's most powerful 12-incher; its amp is rated to deliver 250 watts to the magnetically shielded front-firing driver. The 18-inch black-vinyl cube also houses a down-firing 15-inch passive radiator, which should help the 1215X reach its spec'd low-frequency limit of 22 Hz. For system balancing, the 1215X offers a low-pass filter that's continuously variable from 40 to 120 Hz, a switchable 80- or 100-Hz high-pass crossover, and a processor-direct switch, for hooking the sub directly to a preamp/surround processor or receiver. Circle 109 on reader service card



◀ perfect pitch

The CN35E95 (\$2,699), a 35-inch console-type direct-view TV with a 4:3 aspect ratio, is part of Toshiba's FST Perfect SuperTube line of television sets. The FST Perfect tube is said to be extremely flat and, along with the Dark-Tint high-contrast screen, it deflects glare and can be viewed effectively from a wide variety of angles. The CN35E95 features three color-temperature settings, dual-tuner PIP, the Cyclone ABX bass system, and a Dolby Pro Logic decoder. It's housed in a console cabinet that measures 49.7 x 35.5 x 28.6 inches (h/w/d) and offers storage space for a VCR. Circle 111 on reader service card

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◀ power ranger

Rötel's RB985THX (\$999) is a five-channel THX-certified power amplifier. Output is rated at 100 watts for each of the five channels. The RB985THX employs toroidal transformers, said to provide the headroom the amps need to hit the dynamic peaks presented by blockbuster movie soundtracks. An RS-232 port makes the amp compatible with many multiroom controllers. Circle 112 on reader service card

afford explorer ▶

Sony makes rear-projection viewing more affordable with the KP-41T15 (\$2,199), a 41-inch model with a 4:3 aspect ratio. The set weighs a mere 113 pounds and measures only 23.25 inches deep. Features include PIP, stereo speakers, and matrix surround-sound circuitry. The 41T15 employs the Advanced Pro-Optic system, whose short-throw Micro-Beam CRTs are said to deliver sharp focus and image clarity; Bi-CMOS circuitry is designed to digitally regulate and fine-tune picture quality. The set is also said to deliver excellent center-to-corner brightness with no hotspotting. Circle 113 on reader service card



◀ match game

Sharp, which offers a total of 14 TV/VCR combination units, now debuts its largest model, the 35-inch 35VXG2000 (\$2,379). Both the TV and VCR sections are loaded with features: There's the StarSight on-screen menu guide with one-touch recording, a Dark Tint tube, and front-panel A/V input jacks. The Child View Limiter can be configured to turn the set on or off in 30-minute intervals, and Channel Lock can be used to remove objectionable stations from the channel rotation. The VCR is a four-head Hi-Fi stereo model and incorporates 19-micron video technology, which is said to deliver high-quality recordings even at EP, the slowest recording speed. Circle 114 on reader service card

no compromise ▶

B&W says their CDM 1 is designed for listeners whose space restrictions necessitate a compromise, but whose ears won't tolerate one. The CDM 1 (\$550 apiece), which measures 14.5 x 8.58 x 10.75 inches (h/w/d), features a 6.5-inch Kevlar-cone woofer and a 1-inch alloy-dome tweeter; response is given as 46 to 30,000 Hz. The top-mounted tweeter is said to help time-align the midrange and high frequencies for improved imaging and phase response. Heavy-duty gold-plated five-way binding posts handle connections. The CDM 1 is rated to handle 30 to 120 watts continuous and fits easily on most bookshelves or stands. Circle 115 on reader service card

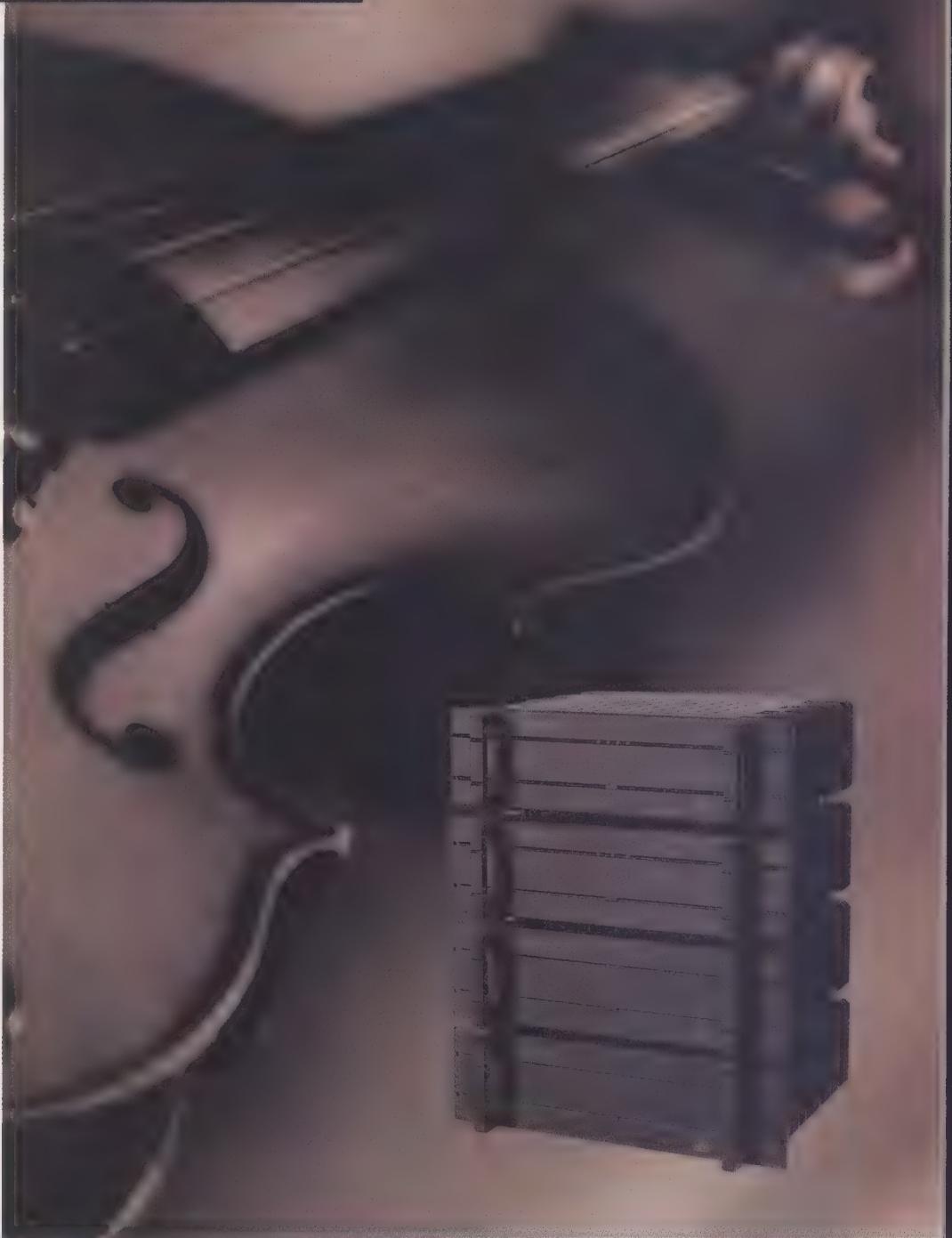


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Mitsubishi 35" color television provided by Jerry's Audio Video of Phoenix, AZ.

True Value

Samsung TXC2726 27-Inch TV Set

TELEVISION-SET TECHNOLOGY HAS progressed to the point where you can get truly fine pictures from a budget 27-inch model. If that seems far-fetched, Samsung's TXC-2726 is ready, willing, and able to prove the point.

The TXC2726 (\$579) is one of the least expensive 27-inch TVs available. Given this fact, you can't expect it to be feature-laden. And it isn't. It offers only one set of A/V inputs and one set of variable audio outputs. Two 2-inch speakers are driven by 2.5 watts of power per channel. The set is 181-channel capable, and a channel can be accessed directly by plugging its number into the remote's keypad—a convenience you might not expect in such an inexpensive set. The manual says that the remote will control any make of cable box or VCR.

A simple see-through on-screen menu system is provided. You press MENU to access the first screen, which offers common picture controls plus three picture-setting presets—the user-adjustable FAVORITE and the fixed STANDARD and THEATER. Another tap on MENU gets you to a screen with AIR/CATV options as well as MTS options (MONO, STEREO, SAP). A third click on MENU calls up the closed-caption screen. The next two menus take you through clock setting, an on/off sleep timer, and channel-search options. The system is simple and useful, and—unlike the fancy graphic menus offered by many of today's TVs—it doesn't obscure the TV image when it's displayed.

A standard glass comb filter is used; Samsung's manual says that it's a "high-resolution" device. The 2726 also has an anti-glare screen.

Straight out of the box, the 2726 was very watchable. A quick check with the *A Video Standard* test disc showed that BRIGHTNESS (black-level) was set almost exactly correct; on the other hand, COLOR, PICTURE (contrast), and SHARPNESS were set too high.

The picture controls are represented by numerical values (ranging from 1 to



64) instead of rudimentary bar graphs. All manufacturers should offer this (most professional monitors do), since it makes returning to specific sets of adjustments a no-brainer. Out of the box, the PICTURE control was set at 48 and all other picture controls were set at 32. Based on AVS, the correct settings are 18 for PICTURE, 37 for BRIGHTNESS, 18 for SHARPNESS, 27 for COLOR, and 33 for TINT.

The "Multiburst" pattern showed that the 2726 had impressive detail in all frequencies. And there was an acceptable amount of dot crawl for a set in this price range.

At this point, the picture quality was quite good in most respects. Color rendition was good, and there didn't seem to be any automatic color or tint circuitry at work. As with most sets, however, yellows were more orangey than pure yellow. Images were sharp, detailed, and accurate, though a high color temperature made them quite blue. Resolution with AVS was 400 lines horizontal and 480 lines vertical. In short, the 2726 delivers a better picture than many pricier 27-inch sets.

The 2726 can be professionally calibrated, and a competent technician will have no trouble calibrating it. Out of the box, the set's color temperature measured 10,600 degrees Kelvin on the top of the gray scale, with a peak light output of 73 footlamberts; the bottom

Samsung TXC2726

1 2 3 4 5 6 7 8 9 10

COSMETICS



EASE OF USE



PERFORMANCE



VALUE



CIRCLE 116 ON READER SERVICE CARD

of the gray scale measured 11,000 degrees. Post-calibration, the set measured almost exactly 6,500 degrees up and down the scale.

Samsung's TXC2726 delivers a good picture with its factory picture-control settings, something very few sets can boast. Carefully adjust its picture controls and the picture will look excel-

lent. And it's good to know that calibration can make its picture very accurate. The only thing I was left wishing for was one or two more sets of inputs for additional video sources. In any case, the 2726 is a great value. It's refreshing to find an affordable set that performs so well.

—Kevin Miller

Bipolar Bears

Mirage MBS & BPS-100 Bipolar Satellites & Powered Subwoofer

BIOPOLARS HAVE BECOME THE REAR "surround" speaker of choice in many home theaters because of the superior way in which they create soundfield ambience. Mirage, a manufacturer of audiophile components, has spearheaded the bipolar movement since they debuted their M Series in the late '80s. With the MBS satellite and BPS-100 subwoofer, Mirage brings this

Mirage MBS	
	1 2 3 4 5 6 7 8 9 10
COSMETICS	•
EASE OF USE	•
PERFORMANCE	•
VALUE	•

CIRCLE 117 ON READER SERVICE CARD

high-end technology to affordable home-theater speakers.

The MBS is a masterpiece of domestic acceptability. Attractively finished in either gloss black or satin white, this speaker (\$175 apiece) is tiny, measuring about 10.5 x 6.5 x 4.75 inches (h/w/d). It's spec'd to have usable bass to 110 Hz and on-axis frequency response from 120 to 20,000 Hz.

Front and rear baffles sport identical driver complements: a 0.5-inch dome tweeter and a 4.5-inch polypropylene woofer, both of which are magnetically shielded to facilitate placement near a television. While the nice-looking binding posts were a disappointment (I stripped a plastic hex nut as I attempted to finger-tighten a wire connection), the speaker cabinets,

drivers, and grilles are of extremely high quality.

The MBS is one of the best surround speakers I've heard, regardless of price. Rather than call attention to itself, the ideal surround speaker bathes the listener in ambient information, without betraying its location in the room. The MBS closely approximates this ideal, generating the sort of vast, transparent soundfield I've come to expect from topnotch bipolar designs.

Equally impressive is what the MBS doesn't do. These solid little boxes are virtually free of enclosure or driver resonances, which can impart an unnatural, mechanical quality to sound. Only in the area of bass extension does the MBS yield to its larger, more expensive competitors (it was -3 dB at 120 Hz), but, as noted, low-frequency output was never an MBS design goal. In any case, it isn't vital in a Dolby Pro Logic-based surround speaker.

While the MBS's surround performance can only be described in superlatives, I found it less well suited to the role of main or center-channel speaker. To its credit, the satellite develops a panoramic front-channel soundstage populated by three-dimensional images. But I found that the range of volume contrasts it can comfortably convey is too limited to satisfy home theater's demands. Its low-bass limitations are more of a detractor when the MBS is used in a front-speaker role, as well. Clearly, the MBS was primarily engineered for surround applications—a task at which it excels.

The BPS-100 powered subwoofer (\$480) is simply great. Its bipolar design, which employs two side-firing 6.5-inch woofers driven by an internal 100-watt amplifier, helps it deliver the type of transparent, enveloping bass that's eluded all but the most expensive subwoofer systems. Its small cones

have a low moving mass, so their motion can be tightly controlled by the amp. As a result, the BPS-100 is free of the boomy sound or "overhang" that plagues many budget designs. And it's fairly compact, measuring 9.25 x 20.5 x 16 inches (h/w/d).

This sub also provides an exemplary complement of user controls. While the high-pass filter offered by earlier, pricier Mirage subs could be accessed only through line-level RCA jacks, the BPS-100 provides this function through speaker terminals as well. In addition to the usual level and crossover-rolloff controls, the sub's rear panel also includes an A/V contour switch, which lets you equalize bass response.

The BPS-100 is small enough to hide neatly out of sight. But a bipolar speaker performs at its best when it's located a few feet from a side wall, and this sub is no exception. Mirage had sent me a pair of the subs, and I achieved a seam-

Mirage BPS-100

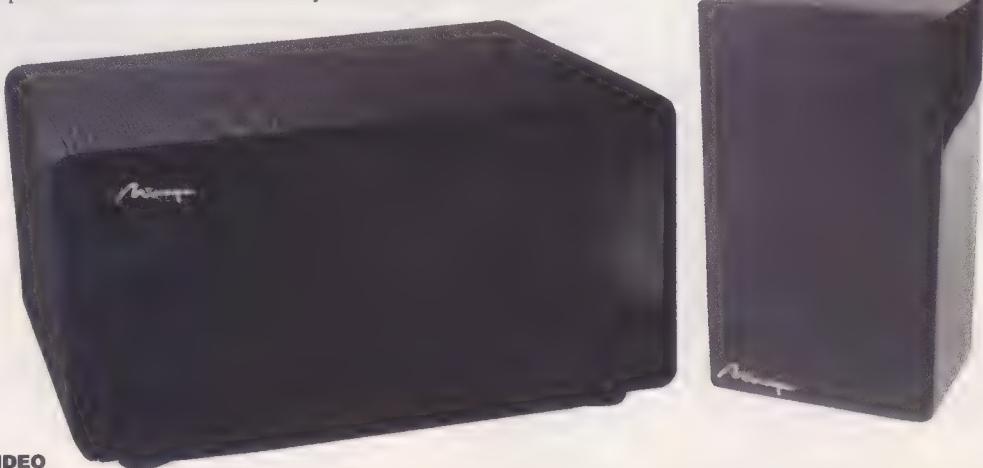
1 2 3 4 5 6 7 8 9 10

Mirage BPS-100	
	1 2 3 4 5 6 7 8 9 10
COSMETICS	•
EASE OF USE	•
PERFORMANCE	•
VALUE	•

CIRCLE 118 ON READER SERVICE CARD

less match between them and my satellites by positioning the subs directly in front of the main channels.

The BPS-100 also went very deep for a subwoofer in this price-and-size category, supplying generous quantities of low bass down to about 30 Hz. While it doesn't deliver the lowest half-octave of the frequency spectrum, none of its



peers do either; you'd have to roughly double this sub's cost to get down to 25 Hz and double it again to get true 20-Hz output. Make no mistake, though: Most listeners will simply marvel at the sound the BPS-100 makes.

—Anthony Chiarella

Space Cowboy

Panasonic PV-4564 Hi-Fi VCR

MANY HOME-THEATER ENTHUSIASTS are happy to hook up six speakers in a Dolby Pro Logic-based surround-sound system. Those who like the idea of surround sound, but don't want to wrangle with, make room for, and/or pay for the extra components, should check out Panasonic's PV-4564 Hi-Fi VCR. While the 4564 (\$430) is a very good all-around VCR, its built-in Spatializer processor delivers basic surround-sound ambience via a TV's built-in amplifiers and speakers.

Like the developers of the similar SRS and Q-Sound technologies, the company that designed Spatializer (and licensed it to Panasonic, among others) based their processing on psycho-acoustic research, which shows that our sense of the direction in which sound is traveling is based on its precise arrival at our ears (known, in audio parlance, as "arrival time"). They found that if they grouped certain frequencies in specific bands, and then delayed and manipulated these bands, listeners would be fooled into hearing the illusion of spacious, surround-type sound.

The PV-4564 proffers a three-position SPATIALIZER slide switch—offering off, medium-effect, and maximum-effect positions—on its front panel. According to Panasonic, Spatializer works best with movies and videos that have been specially encoded; using a list supplied by Panasonic, I viewed *Speed* and *Eric Clapton Unplugged* (other recommendations included *The Mask*, *Jurassic Park*, and the entire Indiana Jones movie series). Note, however, that there's no special labeling on these programs to indicate Spatializer compatibility. What they seem to have in common is that they're all big-budget productions with high-quality surround-encoded soundtracks.

Spatializer was very effective with *Speed*. There were times when background sounds seemed to come from

the sides of the room, if not the rear (as they would with a Dolby Pro Logic system). With *Clapton Unplugged*, the effect spread out the music to the sides of the TV screen, but there was no sense of localization, as E.C.'s guitar seemed to come at me from both the

dial for this purpose), and you have to go into the setup menu to change between the tuner and line inputs.

The remote is compact and versatile. It has separate buttons—including three sets of channel up/down buttons and three separate power buttons—for



extreme left and extreme right of the room simultaneously. With broadcast TV (*Barbra, The Concert*), it created a wider soundfield, but it also gave Ms. Streisand's voice a tinny, metallic twang, along with a slight reverb. Interestingly, Spatializer effects were stunning with some TV commercials I heard during this concert. Perhaps they were encoded with Spatializer-style cues; plenty of TVs, including some RCA and Sony models, have Spatializer, SRS, or similar circuitry built-in.

Otherwise, the PV-4564 is a very capable mid-line Hi-Fi VCR. It offers a shuttle-dial control on the VCR, front-panel A/V input jacks, and a sleek low-profile cabinet. A cool blue display indicates the time and tuned channel number. Initial setup is a breeze. The VCR automatically scans for channels in use when you first turn it on. When you first turn it off, it automatically searches for a PBS TV station carrying the Extended Data Services (EDS) clock-set signal and sets its clock.

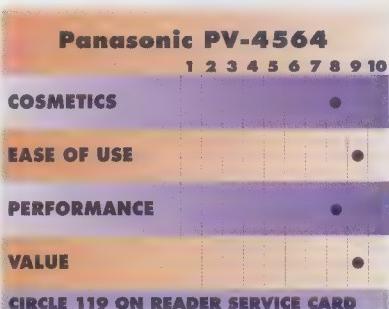
The eight-event timer is remarkably easy to program thanks to the remote's thumbwheel programming control—rotate the wheel to make selections (such as time, channel, and record speed), and press the wheel to enter each selection. The 4564 includes VCR Plus+ programming, and Panasonic has managed to make the process less tedious than usual.

The VCR can also control your cable box. To set this up, you must physically place the box on top of the VCR, where a small infrared window transmits channel-change commands. Two complaints: The VCR itself lacks a pause button (though you can use the shuttle

the VCR as well as a TV and cable box. The instruction manual lists 17 brands of TVs and 47 brands of cable boxes the remote can control.

The 4564 produces very good pictures, delivering 240 lines of horizontal resolution at SP. Performance at the slow SLP speed was only slightly worse than at SP (230 lines). It can also record and play back at the LP speed (4 hours per T-120 tape), and you can change speeds while recording without stopping the tape. Still frames appeared clean and free of noise bands, as did the single-speed slow-motion playback. Hi-Fi performance was a couple of notches below the best models, measuring -3.5 dB at 20,000 Hz, but the VCR sounded just fine to the ear.

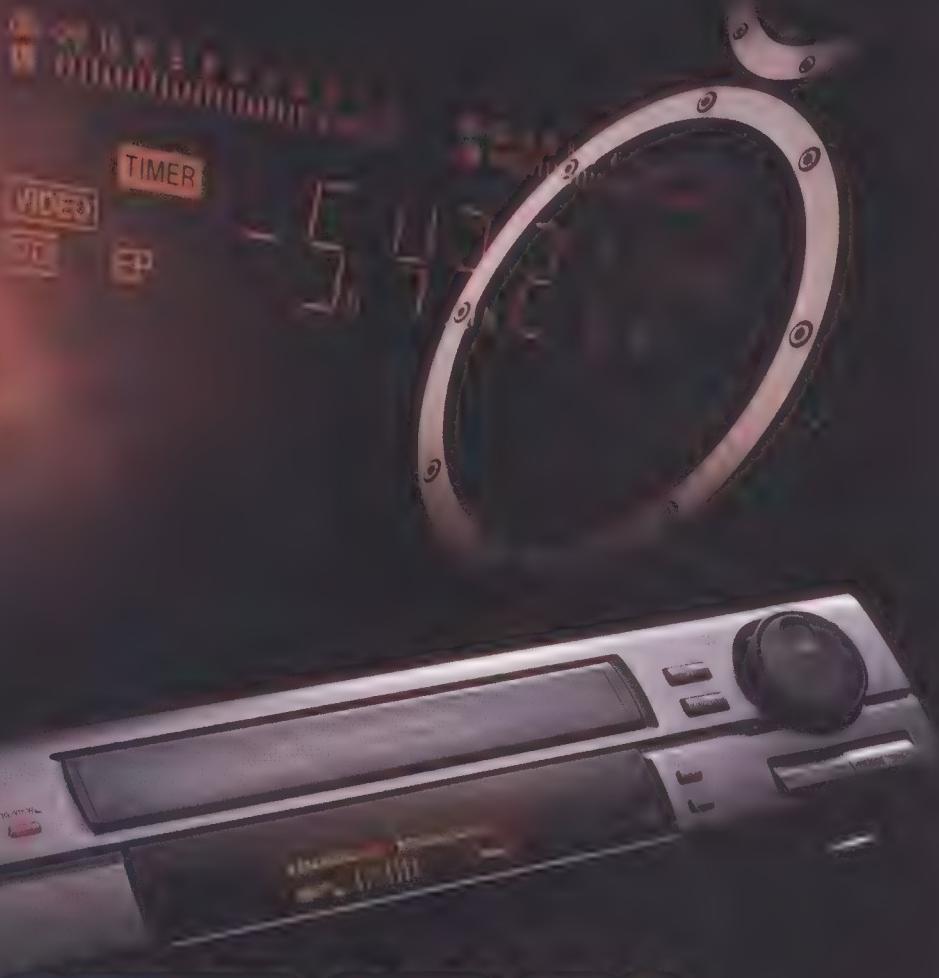
In sum, the PV-4564 is a very competent, reasonably priced Hi-Fi VCR. The Spatializer circuitry can't take the place of a true surround-sound system, but it



does add some ambience, especially with big action flicks. That's all some people will want, of course, and it should help in small rooms or in those where a multi-speaker setup doesn't make sense. It's nice to know that it's there if you need it.

—Cliff Roth

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IMAGE CONSCIENCE

Tony Oursler's Psychological Projection

ENTER THE DIMLY LIT CONFINES OF New York City's Metro Pictures gallery and you have to sidestep a mattress on the floor. As you do, you'll be confronted by a woman's voice: "Hey, you! What are you looking at? Get out of here." When your eyes adjust, you can make out who's talking—it's an empty robe, some pajama bottoms, and the video image of a face projected onto a blank pillow "head." The face peers out at you occasionally from under the corner of the mattress. Without much conviction, it adds: "I'll kick your a--... I'll f--- you up. Leave me alone." The half-squashed face glares at all comers, helpless. The illusion is as disconcerting as it is funny, pathetic, and beautiful.

This is the experience bestowed by *Getaway #2*, a wonderful example of the video installation work of video artist Tony Oursler. Video art has enjoyed a strong year in the United States, especially in museums. Two of the medium's stalwarts, Bruce Nauman and Gary Hill, made significant splashes—New York City's Museum of Modern Art (MOMA) recently mounted a large retrospective of Nauman's video and installation work, while the city's Guggenheim Soho museum presented a show of Hill's discombobulated video bodies. And eight mid-career video artists, including Oursler, are represented by individual installations at MOMA through mid-September.

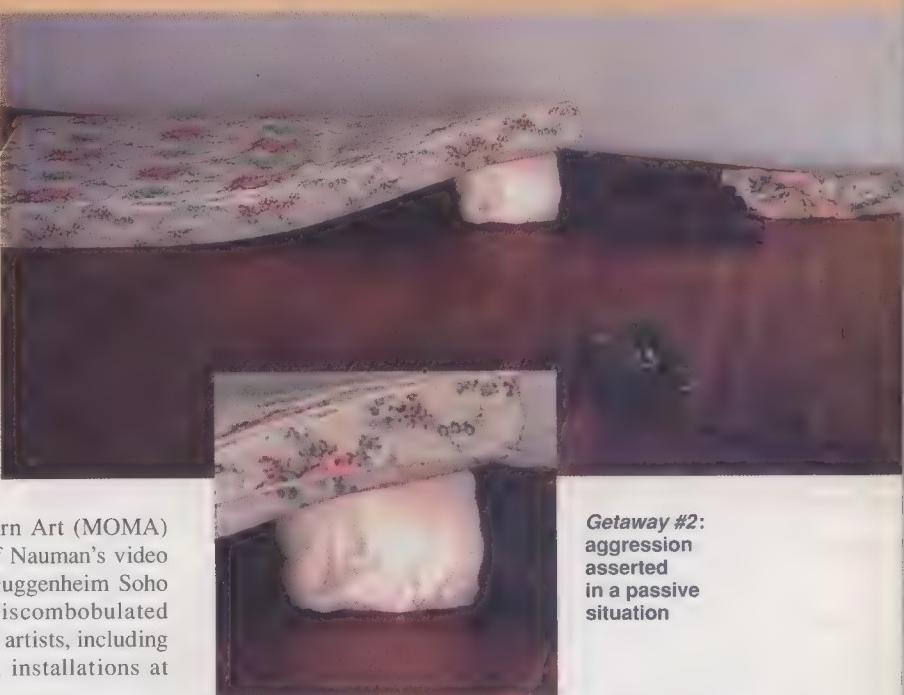
Though Oursler's work has been exhibited extensively, until recently he was better known in Europe than in his native United States. The MOMA show may change that. Word of Oursler's work spread so quickly during his recent solo show at the Metro Pictures gallery that tour buses made the gallery one of their required stops.

It's clear that all kinds of visitors are genuinely engaged by Oursler's work. Smiles and spontaneous discussions erupt as viewers are confronted by these conglomerations of the neurotic—an unusual occurrence, given the cursory viewing and quiet contemplation you often come across in New York City galleries. And the MOMA showcase for Oursler's installations may afford him an opportunity to reach a larger audience.

Oursler, 38, graduated from the California Institute for the Arts (Cal Arts) in 1979. His work has been displayed in galleries and museums throughout



North America and Europe, including the Whitney Museum in New York City and the Centre Georges Pompidou in Paris. From his beginnings as an art student in 1976, he was fascinated by video's potential. Fortunately, Cal Arts had the porta-packs (the first portable video equipment, with a separate camera unit and recorder) that offered artists the flexibility and mobility they needed for experimenting with the new medium. Some of Oursler's first tapes employed hand-crafted sets and objects—such as Barbie, Ken,



Getaway #2:
aggression
asserted
in a passive
situation

and G.I. Joe dolls—as participants in intense but humorous psychodramas that twisted the structures and narratives of network television.

While many of Oursler's early tapes focused on the dense psychological worlds he crafted for his characters, his recent works have been installations such as *Getaway #2*, which are built around figures he calls "dummies" and "dolls." He views these surrogate figures as "agents that enter the world in a more aggressive way, more as catalysts." The projections onto the handmade dummies are an intriguing intersection of sculpture and video and make a strong impression that belies their simple ingredients: inexpensive projectors and VCRs, tripod-type lighting stands (which become both backbones and scaffolds), rummage-sale clothes, tiny hand-sewn materials, and blank, pillow-like heads. The mute, crude figures come to life when looped or repeated video images are projected

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onto their "heads." Their dialogues, self-analysis, and phobias make them simultaneously endearing and haunting.

"I'm really interested in how one's own narrative history is created," Oursler says. "What you did, what was done to you . . . I tried to make figures that could exist in between the interior and exterior worlds, literally, like seers that we can't see, and that can't see us. Language and image become one, as they do in the human body. Video no longer acts as a window to look through, but is somehow made physical."

After working out an idea, Oursler writes a script of the dialogue that he and his collaborators will enact. In *Getaway #2*, the artist worked with Tracy Leipold, a friend, musician, and performance artist who became the indignant presence under the mattress. After discussing the dialogue with Leipold, Oursler shot close-up Hi8 footage of her face pressed against a wall; markings on his monitor insured that these images could be projected onto the "face" of the dummy with the desired alignment. The images were captured in multiple takes; Oursler says he often gives his collaborators direction off-camera, whispering lines when necessary.

Once the video footage is shot and he's chosen his favorite take, Oursler copies the Hi8 images to VHS, creates an audio/video loop, and then works with the projectors and other materials in his studio. Though he's considering using laserdisks for future installations, he currently runs the footage for projection on VHS decks; he favors Fujix's small Model 401 and Model 701 projectors (they're inexpensive as well as simple to use) and is now experimenting with new Sony mini-projectors. Oursler says he's always been interested in projection, but the cost and size of standard video projectors make them impractical; when he came across the mini-projectors advertised in the back of a magazine, he jumped.

Oursler projects his images onto household materials and used clothes. In his most recent shows, he used domestic items like dresses, suits, flowers, and chairs. Materials come from thrift stores as well as friends—the mattress for *Getaway #2* was saved from a friend's garbage.

A significant part of Oursler's video work involves more intense collaboration with other artists, including writers, performance artists, and videomakers. He's worked with the alternative rock band Sonic Youth on a music video and, a few years ago, with videomaker Joe



System for Dramatic Feedback (detail): prompts smiles and serious discussion

Gibbons on a strange but hilarious cable-TV pilot called *On Our Own*. The show followed the misadventures of two patients from a mental institution as they try to survive "on the outside" after being released. When the institution gives the outpatients a camcorder to better document their progress, we see the world through the viewfinder of a hand-held Hi8. Oursler says the satire was a commentary on the artist's status as a "dysfunctional outsider" in society.

These and other projects have kept things interesting for Oursler. Producing one type of work year after year, he says, takes the magic out of working with the medium. All of which explains why he wasn't unhappy when *On Our Own* proved short-lived: Moving on "was kind of a good thing; it kept things fresh and alleviated the pressure of working in one single way."

Video technology helps, too. "In the '90s," Oursler says, "people are thinking in the direction of more complex and elaborate story lines, like you find on CD-ROMs; video can exploit these well." The artist points out that video offers other advantages: "It has a high-quality image and two channels of sound, and it's cheap." On the other hand, he acknowledges, technology isn't an answer to the world's problems: "Basically, I have no respect for solely technology-based [art]work. Students think technology's going to save them because it's always changing—but none of it's *really* that interesting. I mean, there's no aerosol video yet."

That may be true, but there is video in

a jar. In *Organ Play #2*, part of Oursler's Metro Pictures show, cow and sheep organs housed in small jars of formaldehyde sat on a metal tabletop. The mouths of a man (Oursler) and a woman (Leipold) were projected onto the organs, where they discussed their "physical states." The image of a woman's lips, luridly enhanced by red lipstick and projected onto what looks like a kidney, was at once comical and disturbing. "How do you feel?" she asks, sounding pathetic and confused. "I can't tell if I'm alive or dead."

The effect is potent. Among these works, Oursler says that *Getaway #2* is, perhaps, the most effective: "It brings together many of the concerns I've been working with—like aggression asserted in passive situations—in a simple way. "Also," he adds, "people seem to keep coming back to it."

Though Oursler's refined his process over the years, there are always challenges. He still encounters difficulties working with video in a gallery setting—most spaces aren't designed for it. And then there's the audience's attention span. The artist says that gallery patrons usually don't spend long periods of time looking at an individual painting or piece of sculpture and, as a result, have a hard time focusing their attention for any length of time on a video. "It is very difficult to make anything with video that will hold a viewer's interest."

Still, gallery visitors seem transfixed by Oursler's work—and the critics have raved. Writer Elizabeth Janus comments that ". . . throughout Oursler's work one senses that there is a malfunctioning of an apparently orderly world, a feeling that is both fascinating and unsettling, much like the headlines of a tabloid newspaper." Peter Schjeldahl, of New York City's *Village Voice*, wrote that Oursler's "bedeviled dummies emerge from a psychic swamp of childlike consciousness laced with grown-up manias and depressions, an Okefenokee of psychological, social, and practically metaphysical futility . . . his most accomplished tone, at this point, is a comic contrast between impeccable high-tech and highly peccable humanity."

Accolades aside, Oursler's idiosyncratic vision illuminates our own evolving, but ambivalent, relationship with technology. The artist says that what we do with video affects the vitality of our culture. With funding for the arts and even public television under fire, the artist and his peers clearly have their work cut out for them.

—Stewart Applegath

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CIRCLE NO. 65 ON READER SERVICE CARD

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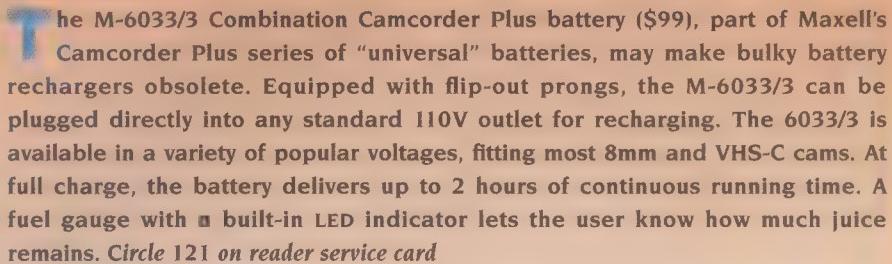
OUR NEWEST TELEVISION



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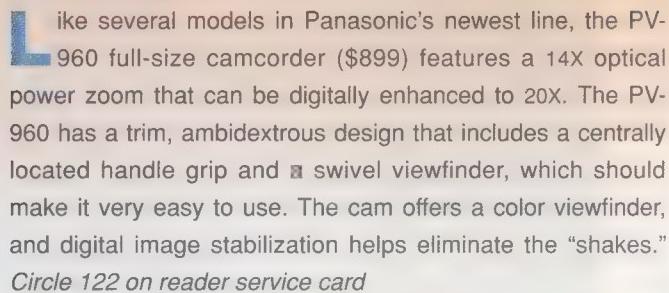
 ridging the gap between pro and amateur editors, Videonics' Edit Suite (\$699) is being touted as the first low-price, multiformat multiprotocol A/B-roll edit controller. The Suite operates as a single-source, cuts-only editor via two separately programmable GPI ports; add Videonics' MX-1 digital video mixer (\$1,199, not shown) and it becomes an "A/B/C/D" edit controller capable of operating up to four sources and a recording VCR. It's said to read all major time codes and has a 250-event memory. An RS-232 interface allows the user to upload or download EDL data as well as export CMX files. *Circle 120 on reader service card*

cell mate ▶

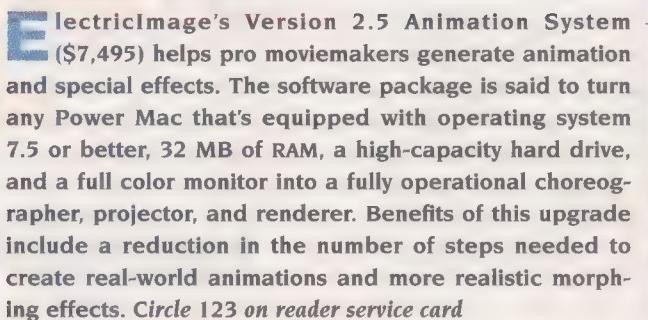
 **T**he M-6033/3 Combination Camcorder Plus battery (\$99), part of Maxell's Camcorder Plus series of "universal" batteries, may make bulky battery rechargers obsolete. Equipped with flip-out prongs, the M-6033/3 can be plugged directly into any standard 110V outlet for recharging. The 6033/3 is available in a variety of popular voltages, fitting most 8mm and VHS-C cams. At full charge, the battery delivers up to 2 hours of continuous running time. A fuel gauge with a built-in LED indicator lets the user know how much juice remains. *Circle 121 on reader service card*



◀ zoom town

 **L**ike several models in Panasonic's newest line, the PV-960 full-size camcorder (\$899) features a 14X optical power zoom that can be digitally enhanced to 20x. The PV-960 has a trim, ambidextrous design that includes a centrally located handle grip and a swivel viewfinder, which should make it very easy to use. The cam offers a color viewfinder, and digital image stabilization helps eliminate the "shakes." *Circle 122 on reader service card*

animate for life ▶

 **E**lectricImage's Version 2.5 Animation System (\$7,495) helps pro moviemakers generate animation and special effects. The software package is said to turn any Power Mac that's equipped with operating system 7.5 or better, 32 MB of RAM, a high-capacity hard drive, and a full color monitor into a fully operational choreographer, projector, and renderer. Benefits of this upgrade include a reduction in the number of steps needed to create real-world animations and more realistic morphing effects. *Circle 123 on reader service card*



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VIDEO TEST

Do the Rave

JVC's GR-SZ9 offers it all: quantity, quality, and simplicity



APPEARANCES CAN BE DECEIVING: THE GR-SZ9 IS NOT a camcorder, it's a video smorgasbord—and a one-person video production unit. JVC has succeeded in improving upon what was already a great camcorder—1994's GR-SZ7, VIDEO's choice for S-VHS-C camcorder of the year—making it an even better value. At \$1,799, the SZ9 is a genuine bargain; you can record high-quality images in Hi-Fi stereo sound and also get more control over how the camcorder—

and, ultimately, your audience—sees those images.

In addition to an electronic image stabilizer (which can be left on full time without image degradation), an improved color viewfinder, and even greater low-light sensitivity, the SZ9 offers more production effects, transitions, and utilities than the staggering number offered by the GR-SZ7. Add the supplied editing feature and a remote and you can customize your images as well as your finished tape to your art's content.

Bucking the industry trend of simplifying camcorders until there are few options left, JVC has loaded the SZ9 with more manual controls than



its predecessor had. This camcorder also delivers a better picture than the GR-SZ7, while simultaneously offering point-and-shoot simplicity. And the SZ9 manages to be strong on both counts. While it's easy to use in its AUTO mode, you can customize the camcorder extensively, choosing from long lists of effects. One thing's clear: You won't need a mixer, processing amp, or external effects generator here.

Some of the possibilities include fades, multiple wipes, high-speed shutters, dissolves, mosaics, a widescreen-like CINEMA mode (black bars at the top and bottom of the image), SEPIA (which adds a brown

tone), VIDEO ECHO (a radiating layer effect), and MONOTONE (black-and-white). While some of the effects and transitions can't be used simultaneously, a light in the viewfinder warns you when a given combination isn't possible. Carried over from the GR-SZ7 is SNAP SHOT (accessed by a button in front of the viewfinder), which offers a Polaroid snap-shot effect with a shutter-like sound; MOTOR-DRIVE lets you record multiple snaps in rapid succession.

The SZ9 also features new digital signal processing (DSP), which samples information from a greater variety of sources, such as infrared sensors and flicker data. JVC says that DSP contributes to improved autoexposure, autofocus (TTL contrast-type), and tint recognition. White-balance versatility is improved, too: In addition to the AUTO, SUNNY, CLOUDY, and HALOGEN settings, there are three custom manual white-balance settings (two more than were available on the GR-SZ7), for a total of seven, and you can hold particular light settings in memory for later

BY STEWART APPLEGATH

use. Shutter speed is one of the few functions here that can't be switched manually.

JVC has located only a few of the cam's controls on the body of the camcorder, which measures about 4.5 x 4.2 x 7.4 inches and weighs 1.8 pounds; most are "soft" controls located in the menu system. Playback controls are located behind the lens under a plastic panel in front of the viewfinder. When the power switch is set to PLAY, the menu controls expand to include those for audio playback (HI-FI, MIX, NORMAL) and tracking. Special features include still frame, frame advance, slow motion, speed play, auto rewind, and a flexible timer.

One unusual option is the SZ9's manual adjustment of the sharpness, tint, and color of the image you're shooting. These controls, which are accessed in a sub-menu under the PICTURE menu, are more effective and offer greater range than those on the GR-SZ7; JVC says the difference is due to improved white balance (multiple settings with plus/minus compensation) and signal processing. The SZ9 also has a greater number of gain-control settings for shooting in low-light situations.

There are three main mode settings—AUTO, PRESET, and VARIABLE PRESET—that determine how easy or creative it can get in any shooting situation. The AUTO mode takes care of everything, allowing you to get busy shooting video immediately. The PRE-

SET mode gives you groups of effects to choose from, with limited manual control. And VARIABLE PRESET offers the fullest range of manual controls and effects.

Choose PRESET and you'll have access to the features that JVC feels will get heaviest use: wind-cut, zoom, alarm, and gain-up are available in addition to the fades, wipes, and effects triggered by the P.AE/EFFECT (special effects) and FADE/WIPE buttons. Whenever one of these effects functions is activated, a menu comes up: In the former, you have a choice of CINEMA, SPORTS, TWILIGHT, SEPIA, or MONOTONE. In the latter, you can pick WHITE FADER, MOSAIC FADER, AUTO SELECT 1, CORNER WIPE, and DISSOLVE. The AUTO SELECT option programs a sequence of eight fade/wipes, adding variety to your videos without your having to take the trouble to program each effect individually.

The VARIABLE PRESET mode accesses a larger (yes, larger) menu system, with more features that you can use to customize the PRESET mode's lists. Once you've programmed what you want, you can access it quickly by pushing either the P.AE/EFFECT or FADE/WIPE button. You can utilize JVC's lists of PRESET effects, be more adventurous by mixing in a few of your own, or go wild and start a new list from scratch. The cursor control for the menu is located on the lower side of the camcorder in the form of "+" and "-" buttons; in PRESET and VARIABLE PRESET,

you can also use these controls to manually control the iris.

And there's more: You can choose to wipe or dissolve to or from a color or a live picture. This is an extremely unusual feature in a camcorder: Internal memory stores the last image, then uses it to make the transition to the next scene. Note that turning the cam off will erase the memorized scene and that sound isn't recorded during the wipe/fade process.

The indigo LCD readout on the SZ9's side makes all display information extremely legible under all ambient-light

BY THE NUMBERS

Measurements by Berger-Braithwaite Labs

Horizontal resolution: camera, 400 lines; viewfinder, 280 lines; recorder (S-VHS), 400 lines; recorder (VHS), 240 lines

Playback picture S/N (SP): unweighted luminance, 47.8 dB; weighted luminance, 50.8 dB; unweighted video, 38.3 dB; weighted video, 43.9 dB; chroma AM, 42.3 dB; chroma PM, 41.7 dB

Playback picture S/N (EP): unweighted video, 37.7 dB; weighted video, 43.7 dB; chroma AM, 40.5 dB; chroma PM, 43.7 dB

Minimum illumination: 4.7 lux for 50 IRE

Audio frequency response: Hi-Fi, 20–20,000 Hz +0.5, -0 dB

Audio dynamic range: Hi-Fi, 86.1 dB

ing conditions. In addition to displaying functions, it also provides a graphic readout of battery, tape, and function status.

The SZ9's electronic stabilizer did its job well. The cam also has a two-speed power zoom. In AUTO mode, the maximum zoom is set at 10X; switching to PRESET or VARIABLE PRESET lets you take advantage of the 10X (5 to 50 mm) or outrageous 100X magnification. These digital zooms are continuous and are set in motion with a mechanical zoom toggle. This year's model also adds a feature called TELE MACRO, which allows you to get macro-type detail without needing to get too close to a subject. (With other cams, you generally can't focus on close objects while the camera is zoomed in.) Minimum focusing distance is 1 and 34 inches for wide angle and tele, respectively.

The SZ9 has a manual focus mechanism controlled by a knob on the front part of the cam. Even in AUTO mode, you can push a button on the end of the focus wheel to switch to manual

THE SHORT FORM

JVC GR-SZ9

Component type: S-VHS-C camcorder

Price: \$1,799

Target: Serious videographers

KEY FEATURES

- Full-time electronic image stabilization ■ Color viewfinder ■ Extensive menu of custom effects ■ 100X digital zoom, 10X optical zoom
- Digitally assisted autoexposure, autofocus, and white balance
- TELE MACRO focusing ■ Random assemble editing ■ Remote control

SUMMARY

- Offers extensive manual controls while maintaining point-and-shoot simplicity ■ Its picture is improved compared to its predecessor
- Capably serves as a mixer, processing amp, and effects generator ■ Its tape counter isn't flexible ■ In terms of quantity, quality, and simplicity, there is no other camcorder like it

Circle 124 on reader service card

mode—this setup is more convenient than those on similarly priced models. Located nearby is the switch for the sliding lens cover, a really useful (if standard) feature.

The random assemble-editing feature allows you to program up to eight cuts or scenes for editing onto a VCR. A menu shows in/out points as you program them. It's basic and easy to use. The attachable remote pad is compatible with JVC VCRs as well as some other brands.

If I have one misgiving about the SZ9, it concerns the tape-counter mechanism (carried over from the SZ7). It works fine if you don't mind the cam's standard rewind and fast-forward speed (3x), which is pretty slow; increase the fast-wind speed (to 7x) by holding the FF or REW button for 2 seconds, however, and you'll lose the tape-counter readout altogether—in the viewfinder and in the LCD readout. And when you revert to play mode, the counter resets at zero. This makes logging tapes very inconvenient, especially since JVC intends this cam to be used as an editor. I hope they'll address this quirk soon.

I also hadn't been crazy about the GR-SZ7's color viewfinder, but the SZ9's 0.55-inch electronic version, which includes a diopter, is more sophisticated—it has 13,000 more pixels (for a total of 113,000) and 40 percent more contrast. The improved resolution makes it much easier to fine-focus in manual mode. The smearing I noticed in the GR-SZ7's viewfinder when panning or tilting has been rectified. The viewfinder also has indicators for tape length (20/30/40 minutes) and tape remaining (in minutes), so there's no guesswork.

Audio performance with the Hi-Fi AFM track was quite good, with no noticeable noise leakage from the tape carrier or zoom mechanisms. Credit goes to JVC's microphone amplifier, which selectively modifies the output signal of the mic (a stereo electret condenser) to attenuate unwanted noise while it boosts the audio characteristics of sounds you want to record. There are stereo RCA, RF, and S-Video connections. An external microphone jack is provided, but there's no headphone jack.

Picture quality from the 570,000-pix-

el (gross) 0.33-inch CCD and F1.2 lens generally was very good. Images were sharp, color rendition was accurate, and colors were well saturated. There was very little luminance noise present. Recorded horizontal resolution was 400 lines in SP, 380 in EP—a very nice showing.

THE NUMBER OF POSSIBILITIES OFFERED by JVC's GR-SZ9 is, at first, a bit daunting. Fortunately, most of the op-

tions are truly valuable, and the camcorder is easy to use when you select either the AUTO or PRESET mode. After you take the time to figure out all of the options and potential combinations, you'll be able to get great results from the VARIABLE PRESET mode. With the SZ9, JVC succeeds in a lion-hearted attempt to deliver the whole enchilada: quantity, quality, and simplicity. This is no mean feat. Quite simply, there is no other camcorder like it. ■



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CAM-3

you shoot. Also use it to monitor sound you're recording.

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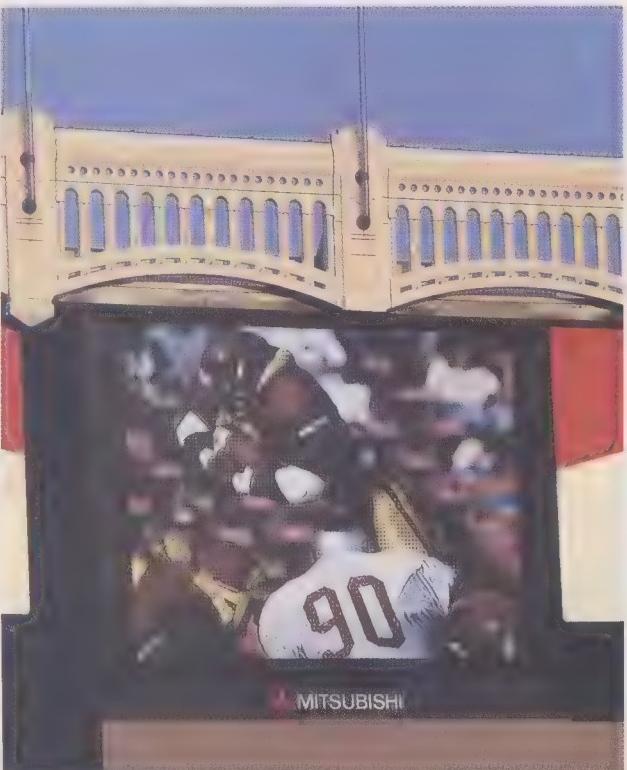
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Point and Shoot

Sanyo PS12 8mm Camcorder

HERE'S A REASON THAT camcorder makers are building no-frills models, and it's the same reason they have bleacher seats in baseball parks: You want to get in on the fun of shooting videos, but you don't want (or aren't able) to spend a lot of money on a camcorder. If this description nails your mindset on the subject, then you're going to like hearing about Sanyo's PS12. It's a simple, no-frills 8mm camcorder that gets the job done, and it should arrive in your neighborhood with an incredibly low street price—while it's tagged with a \$499 suggested retail price, you may find it in shops for as little as \$300 or less.

The PS12 combines the basic advantages of the 8mm format (small size, long recording time, decent picture) with extreme point-and-shoot ease. Its completely automated functions work well in situations where you want to use auto controls (in other words, in scenarios where manual control isn't important). In any case, there aren't many bells or whistles here. There's no electronic viewfinder, zoom, microphone or headphone jacks, remote, or infrared receiver; you also won't find shutter speed/white balance, fader, iris adjustment, backlight compensation, LANC/edit functions, titling capability, or recording from line sources. The PS12 shoots automatically, plays back . . . and that's about it.

What controls it does have are few and simple to use. There's a power-on/off switch and a record button on the back of the cam, along with an LCD readout that indicates basic functions: battery life, tape/eject, record/pause, time elapsed, and several warnings. Nearby is a simple one-touch button for play and the camera modes. The optical, non-electronic viewfinder, which has a diopter focus, is located above the lens. The PS12 also has a manual 3X zoom; a small mechanical lever that'll be close to the index finger of



your shooting hand handles the zooming.

The mechanical viewfinder/lens arrangement may sound unwieldy, but in fact it's simple and direct: You can zoom as fast or as slowly as you want, and you can achieve relatively smooth zoom action once you get used to it. Sanyo has also included two LED indicators in the eyepiece to indicate record/pause and warnings.

The focus mechanism on the PS12 is fixed, so you won't have to worry about focus-hunting. Everything that's at least 6 inches from the lens will always be in focus. Combined with an automatic shutter speed of one-sixtieth of a second, this adds up to true simplicity, enabling you to be prepared for any spontaneous shooting. Some versatility is lost, of course, but that's to be expected with a budget model.

The playback and eject buttons are hidden under a flip-up panel on the PS12's top. Included here is a blank-tape search function, a handy feature in the absence of an electronic viewfinder; in either the playback or camera mode, you can use this feature to find where you left off record-

TECH TIP

Many VCR cleaning tapes don't have a clear leader at the beginning, so they don't stop automatically after rewinding. If your VCR doesn't have a safety-stop feature, the abrupt stop could damage it. To prevent damage, simply affix the leader from a cheap videotape at the beginning of the cleaning tape.

Hi Sawada
Montreal

ing or playing. Sanyo has also included a simple but effective lens cap that covers both the lens and the optical-viewfinder lens: Its push-and-twist action provides a secure fit.

A small, Sony NP-55-type battery fits into a compartment opposite the handgrip on the cam's lower side. The AC connection lurks here, too,

Sanyo PS12

1 2 3 4 5 6 7 8 9 10

COSMETICS	•
EASE OF USE	•
PERFORMANCE	•
VALUE	•

CIRCLE 125 ON READER SERVICE CARD

with an outlet for the power cord perforating the compartment's side.

Picture quality is, as you might expect, slightly lower than what you get from cams with higher price tags, but it's definitely better than some. There was some luminance noise in the picture, but the color accuracy was quite good—overall, the PS12 delivered a nice picture. I saw approximately 230 to 240 lines of resolution in the recorded image.

From an audio standpoint, I noticed more high-frequency rolloff than is normal on an 8mm camcorder of this type. On the other hand, very little noise from the cam's transport leaked through; the PS12 performs better in this area than much pricier camcorders. The onboard microphone also worked quite well.

The PS12 isn't intended for serious videographers, but its simplicity—and its price—should be perfect for casual users who don't want to fuss with controls. And considering its rock-bottom street price, it'd make a great gift. This is a good choice for an easy, no-worry camcorder.

—Stewart Applegath

Out of Control

Sima FX-L Video Ed/It Edit Controller/ Effects Generator

EDITING IS WHAT ENABLES RAW camcorder footage to achieve its potential—it clarifies, refines meaning, and adds polish. There are plenty of editing products seeking your attention; price points run the gamut from under \$100 to \$15,000. Sima's FX-L Video Ed/It edit controller/special-effects generator (\$480) is positioned at the modest end of the spectrum.



Despite its budget status, the FX-L is compatible with camcorders that are equipped with a LANC jack. In this scenario, you can edit up to 23 scenes from the cam to a remote-controlled VCR (you'll get the best results—with no glitches or "rainbows"—if the VCR has flying erase heads). Note that you can't use the FX-L to edit from VCR to VCR.

The FX-L offers three edit modes: Programmed editing generates an EDL that, to some extent, can be modified later. Second, you can perform programmed editing without the help of an on-screen EDL. (This mode proved more confusing than useful.) Third, you can perform simple manual edit-

ing, which lets you cut tape "on the fly"; it's the most accurate of the three methods.

Other functions abound: The FX-L is equipped with a simple, three-channel audio mixer that lets you add music and narration during editing. Video effects include cuts, fades, and wipes. Four wipe shapes are available, and any wipe can be performed in one of eight colors. You can choose a wipe angle between 0 and 180 degrees. And there's a PREVIEW function that plays back your EDL, complete with wipes and fades, so that you can see what your edit will look like before committing it to tape; what you learn may convince you to modify your EDL.

Setting up the FX-L is a breeze. The back of the unit is clearly labeled and the instruction manual is comprehensive. After you've hooked up your camcorder and your VCR, you have to "teach" the FX-L your VCR's IR codes using a supplied controller. Once class

is over, you simply point the controller at your VCR and you're ready to roll.

Editing with the programmed method is pretty simple. Basically, you create your EDL by cuing up sequences and selecting whether you want to fade or wipe in between them, what color fade or wipe you want, and, if you're wiping, its angle. Once you're done programming your EDL, you press PROGRAM to get out of that mode.

As I worked, I discovered that the FX-L isn't completely user-friendly. Most jarring is the dial that adjusts the angle of the wipes, which can be rotated like a volume-control knob but only has legends for 0, 90, and 180 degrees: If you want to perform a 45-degree di-

agonal wipe, for example, you have to guess where that spot is on the dial. Even a top-to-bottom 90-degree wipe, which should be simple to set up, can easily end up looking cockeyed. More legends with detents would be a nice

Sima FX-L

1 2 3 4 5 6 7 8 9 10

COSMETICS



EASE OF USE



PERFORMANCE



VALUE



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refinement.

A circular-wipe option, variable fade and wipe speeds (all fades and wipes take 5 seconds), and an input for non-LANC gear would also be handy. An optional IR controller that plugs into the FX-L's LANC slot would facilitate the use of non-LANC camcorders as well as VCR-to-VCR editing.

The FX-L also had trouble in terms of raw performance. It handles S-format video signals (S-VHS or Hi8) as well as composite video (standard VHS or 8mm), but there is a discernible loss in signal quality with both. Lance Braithwaite, VIDEO's technical editor, measured a 3.1-dB loss—that amounts to degradation on the order of 30 percent.

In addition, the colors of the FX-L's fades and wipes are particularly vulnerable to the quality of the tape being played; blame the unit's reliance on the camera original's control track for operation.

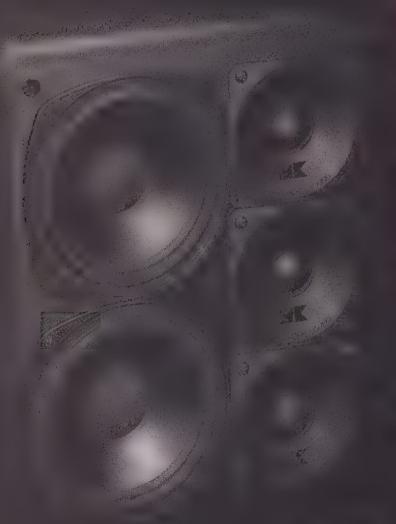
Even with strong video signals, I occasionally noted "ghosts" in my color fades, along with an overall "wateriness" in the colors. And there were minor electronic glitches when fades or wipes were activated; sometimes, they made it to the edited tape.

The FX-L really isn't frame-accurate, either—not surprising given the way it controls your camcorder and VCR. This is especially noticeable at the end of an edit, which generally occurs 2 to 3 seconds after the point you actually selected, though it can be as far off as 7 seconds on either side. This really is sub-par performance, even considering the FX-L's modest price. —Tim Liebe



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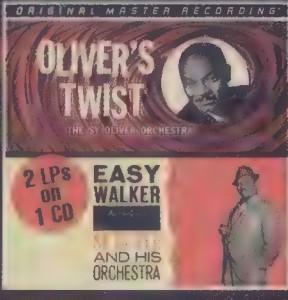
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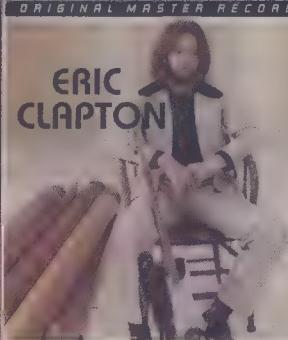
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INTERVIEW WITH THE VAMPIRE

BY SHREWDLY ASSEMBLING A QUARTET of the most dashing leading men in contemporary film (Tom Cruise, Brad Pitt, Antonio Banderas, and Christian Slater), director Neil Jordan (*The Crying Game*) has again pulled off a rare feat: He's made a film filled with homoerotic subtext appeal to mainstream U.S. audiences. *Anything* is possible, apparently, in *Interview With the Vampire* (Warner; VHS, priced for rental, CLV/CAV discs, \$40), Jordan's take on the first installment in Anne Rice's series of gothic Vampire novels. The film's night-heavy cinematography is born again in a fine transfer (1.85:1 with the LD); the eerie beauty of the misty lilac-and-green swamps of New Orleans reflect the romance with death that the newly undead Louis (Pitt) pursues, while the crisp, hard edges of San Francisco's Golden Gate Bridge mirror the urbane, age-of-reason wit of coven leader Le-



Just say no: *Disclosure's* Moore and Douglas in a pressing situation

stat (Cruise). An exceptional surround soundtrack skillfully merges the swamp and riverbank noises of the night with the music of composer Elliot Goldenthal. All of these cinematic elements are expertly melded into a fascinating, nightmarish atmosphere, so that when Lestat lunges at one of his many victims, you'll jump right along with him.

—Josef Krebs

DISCLOSURE

DISCLOSURE PRESENTS MICHAEL DOUGLAS, Hollywood's favorite victim in the battle of the sexes, as a mid-level computer executive caught in a vicious web of office politics when he spurns the advances of his new boss (and old flame), professional spiderwoman Demi Moore. So why should we even give a rat's gigabyte about these executive-suite shenanigans? Because screenwriter Michael Crichton (*Jurassic Park*, TV's *ER*) and director Barry

Levinson (*Bugsy*) know just how to tweak our sense of injustice.

Adding to the fun of *Disclosure* (Warner; VHS, priced for rental, CLV/CAV discs, \$40) is the hip computer-company milieu, as

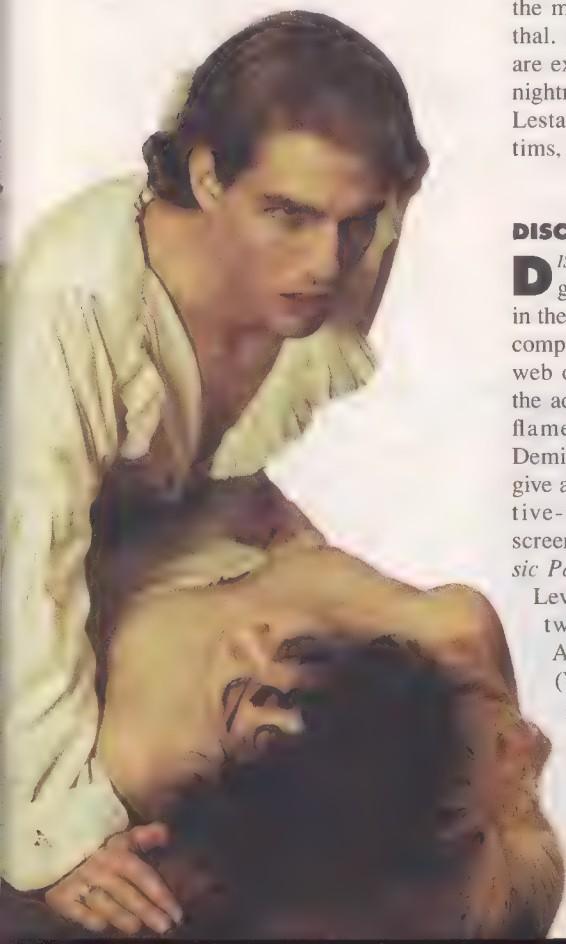
The bite stuff: Cruise in *Vampire*

Douglas and his co-workers talk up the tech in a media warren of glass offices, exposed brick walls, and colorful computer screens; all of it is sharply composed in the proper 2.35:1 ratio on the LD. Even in subdued lighting, Levinson has a veritable field day with reflection shots, slyly suggesting the nefarious undercurrents that lurk underneath some of the characters' outward appearances. A visually impressive cyberspace sequence, in which Douglas dons virtual-reality gear to peek at crucial company records in a computer-generated gothic library (in CAV during Chapters 2 and 3 on side 3 of the LD; for some reason, each side starts with its own Chapter 1), just adds to the eye-candy factor. Though the story's twists and turns aren't always clear (and what exactly does the film's title refer to, anyway?), the thrill of high stakes and high-tech risks keep you riveted to the screen.

—Andy Wickstrom

MARY SHELLEY'S FRANKENSTEIN

YOU CAN USUALLY TELL THE ATTITUDE a given studio has toward the film it's currently pushing by observing the difference between the movie's theatrical publicity plan and the angle pre-



scribed for its video release. Take *Mary Shelley's Frankenstein*: The effectively subtle ad campaign for the movie's ill-fated theatrical run has been replaced with a rather garish one as far as the packaging goes, suggesting more of a B-grade horror flick than a carefully produced effort from the mind of its director and star, the usually well-regarded Kenneth Branagh (*Henry V*, *Much Ado About Nothing*), featuring Robert DeNiro as the monster. Branagh's Dr. Frankenstein brings to life with disastrous results. Branagh's ambition in tackling this classic tale is admirable, but he stumbles a bit by going for a big-budget slam-bang ending.

One thing I found necessary to do while viewing the 1.85:1 *Frankenstein* LD (Columbia TriStar; VHS, priced for rental, CLV/CAV discs, \$40) was to set my monitor's brightness level way down; the tipoff came instantly during the darkly composed opening titles and the Arctic seastorm of Chapters 2 and 3. I also experienced some occasional audio-level drops—several in the first 14 minutes of the film alone, in fact. One bright spot is the LD's extensive chapter-stop listing (67 in all!), but if Columbia really wanted to give this ain't-so-bad film the type of attention it deserves, a THX remastering job and restoration of deleted footage would go a long way in shoring up its rebirth.

—Bruce Lawton

THE SHAWSHANK REDEMPTION

BASED ON RITA HAYWORTH AND THE *Shawshank Redemption*, one of Stephen King's occasional non-horror tales, this fascinating study of a 20-



The doctor is out: *Frankenstein's* Branagh aims to squeeze

year friendship between two convicted murderers examines the real-life ghouls and monsters that unfortunately belong to that faulty equation known as the human condition. Beautifully played by Tim Robbins (who's serving time for—surprise—a murder he didn't commit) and an Oscar-nominated Morgan Freeman, writer/director Frank Darabont's *The Shawshank Redemption* (Columbia TriStar; VHS, priced for rental, CLV disc, \$40) is a very successful translation. The dark, atmospheric camerawork of Roger Deakins (marvelously realized on the LD via a fine Sony transfer and pressing in the essential 1.85:1 aspect ratio), the somber but inspiring music of Thomas Newman, and a fine supporting cast that includes William Sadler, Clancy Brown, and James Whitmore all make you realize that the only bars you ever want to see are the ones that define "letterbox."

—Mel Neuhaus

BIG

BEFORE TOM HANKS WAS *B-I-G*, HE was in *Big* (1988), the Penny Marshall-directed comedy of childhood innocence that, in a way, foreshadows Hanks' *Forrest Gump* performance. Now FoxVideo has issued the first widescreen edition of the film in its correct theatrical ratio of 1.85:1, but, unfortunately, *Big* (CLV disc, \$50) doesn't expand all that much with its restored dimensions; only Chapter 11's famed piano-key-dancing sequence with Hanks and Robert Loggia at New York City's grand FAO Schwarz toy-store takes full advantage of the original full frame. Image quality is very good, though, and colors are bright; there are also several notable surround-sound effects, particularly the brief but thunderous roller-coaster ride in Chapter 18. Details like these might just be *Big* enough to justify a purchase.

—AW

500 NATIONS

5OO NATIONS, A MONUMENTAL 8-HOUR made-for-TV tribute to Native Americans produced and hosted by Kevin Costner, makes a victorious ride into home videoland. A valiant effort at rewriting the bogus history many of us grew up with, *500 Nations* (Warner; VHS cassettes, \$140; CLV discs, \$140), which aired last spring, meticulously relates how Western civilization consistently and successfully raped, pillaged, and nearly exterminated



Key steps: Loggia, Hanks in *Big*

nated a proud people over the course of nearly 1,000 years. *Nations* liberally borrows the "diarist" technique of ace documentarian Ken Burns (*The Civil War*, *Baseball*) as it runs from the Aztecs of Mexico to the Eskimos of the Arctic, skewering historical icons like Christopher Columbus and George Washington in the process. A grim yet fascinating visual document, *Nations*

utilizes live action that's seamlessly spliced together with computer-generated recreations of Indian dwellings, villages, and cities, as well as artifacts, paintings, woodcuts, charcoal sketches, oils, and glass-plate photography. Voiceovers and readings are courtesy of such prominent voices as Patrick Stewart (*Star Trek: Generations*), Wes Studi (*Geronimo*), Eric Schweig (*Last*

of the Mohicans), and Amy Madigan (*Field of Dreams*). And the superb audio track features a well researched score by Peter Buffett, original Indian chants, and a realistic Skywalker Studios surround mix comprised of roaring rivers, bustling forests, thundering hooves, and the inevitable sounds of war. You may never look at history the same way again.

—MN

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1921–27. B&W. The last installment in this wonderful series of restored masterpiece features and equally brilliant shorts: *The General/The Playhouse/Cops* (120 min.), *College/The Blacksmith/The Electric House/Hard Luck* (130 min.), *Steamboat Bill Jr./Convict 13/Daydreams* (115 min.). Stereo. (NR). \$30 per cassette; 3-cassette VHS set, \$80; LD set (full frame), \$100. Kino.

THE BLUE KITE

1993. Lu Liping, Li Xuejian, Pu Quanxin; dir. Tian Zhuangzhuang. One family's personal experience of painful political upheaval in China during the '50s and '60s. Banned from being shown in its native country. Stereo, subtitled. (NR) 138 min. VHS letterboxed (1.85:1), \$80. Kino.

BOYS ON THE SIDE

1995. Whoopi Goldberg, Mary-Louise Parker, Drew Barrymore; dir. Herbert Ross. Three very different women share a trip—each looking to leave something behind and each in search of something better. Good times, good music, good buds, and plenty of road. Dolby Surround. (R) 117 min. VHS, priced for rental; LD letterboxed (2.35:1), \$35. Warner.

THE BRADY BUNCH MOVIE

1995. Shelley Long, Gary Cole, Michael McKean; dir. Betty Thomas. Marsha, Marsha, Marsha! Apparently living in an L.A. time warp, the totally '70s Bradys find themselves colliding with the '90s in the form of 20 years back taxes. Stereo. (PG-13) 88 min. VHS, priced for rental; LD (1.85:1), \$35. Paramount.

DEATH AND THE MAIDEN

1995. Sigourney Weaver, Ben Kingsley, Stuart Wilson; dir. Roman Polanski. What happens when a woman believes that an acquaintance of her husband is the same man who once tortured her? Quintessential Polanski; madness always comes knocking where you live. Dolby Surround. (R) 102 min. VHS, priced for rental; LD letterboxed (1.66:1), \$40. New Line/Image.

Brain drain: *Dumber's* Daniels, Carrey suit up for the lame

DUMB AND DUMBER

1994. Jim Carrey, Jeff Daniels, Lauren Holly; dir. Peter Farrelly. \$125 million can't be wrong—or can it? Aptly titled. Dolby Surround. (PG-13) 110 min. VHS, priced for rental; LD (pan and scan), \$40. New Line/Image.

HOOP DREAMS

1994. Arthur Agee, William Gates; dir. Steve James. Documents the 5-year struggle of two inner-city teens prepping for big-time basketball careers. This portrait of the American dream, '90s-style, has won widespread critical acclaim. Ultra Stereo. (PG-13) 169 min. VHS, priced for rental; LD (full frame), \$50. New Line/Image.

IMMORTAL BELOVED

1994. Gary Oldman, Isabella Rossellini; dir. Bernard Rose. Citizen Beethoven: After Ludwig's death, his assistant goes in search of the master's secret, life-long love; inevitable flashbacks follow. Corny and controversial, this traditional biopic also contains one of the most perfect moments in cinema history. Dolby Surround. (R) 121 min. VHS, priced for rental; LD letterboxed (2.35:1), \$40. Columbia TriStar.

LEGENDS OF THE FALL

1995. Brad Pitt, Anthony Hopkins, Julia Ormond, Aidan Quinn; dir. Edward Zwick. Romance-novel love story that has a last-reel body count worthy of *The Godfather*. But this film is really about big-star Brad, who rides wild stallions, takes off his shirt, and glares silently much of the time. Truly historical. Dolby Surround. (R) 134 min. VHS, priced for rental; LD letterboxed (1.85:1), \$35. Columbia TriStar.

MRS. PARKER AND THE VICIOUS CIRCLE

1994. Jennifer Jason Leigh, Matthew Broderick, Campbell Scott; dir. Alan Rudolph. The rather sad and very human depiction of the life and loves of author Dorothy Parker and the Algonquines: witty-one liners, razor-sashed wrist, self-mocking poems filled with despair, and brilliant minds with few ideas but a talent to amuse. Digital Surround. (R) 124 min. VHS, priced for rental; LD letterboxed (2.35:1), \$50. New Line/Image.

NOBODY'S FOOL

1994. Paul Newman, Jessica Tandy, Melanie Griffith; dir. Robert Benton. A loveless, broke, and aging construction worker has a chance to beat the odds and make something of his and his estranged son's lives; succeeds due to its taut screenplay and a strong performance by Newman. Digital Surround. (R) 110 min. VHS, priced for rental; LD letterboxed (2.35:1), \$40. Paramount.

OUTBREAK

1995. Dustin Hoffman, Rene Russo, Morgan Freeman, Donald Sutherland; dir. Wolfgang Peterson. Killer virus carried by rainforest monkey infects California town and threatens the world. If anyone can get tense drama from a micro-organism, it's the director of *Das Boot* and *In the Line of Fire*. Dolby Surround. (R) 128 min. VHS, priced for rental; CX LD, Dolby AC-3 digital surround, letterboxed (1.85:1), \$40. Warner/Pioneer.

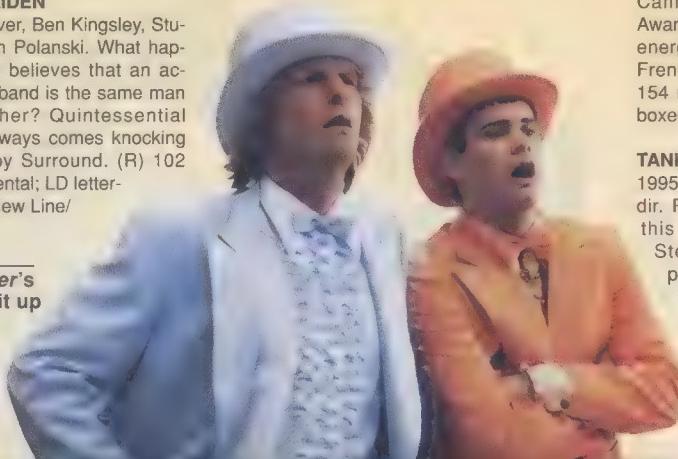
PULP FICTION

1994. John Travolta, Samuel L. Jackson, Uma Thurman, Bruce Willis; dir. Quentin Tarantino. *The Killers* remade by a wiseass: Two professional hitmen and the circle they bust through. Winner of Palme D'Or at Cannes, nominated for seven Academy Awards, etc., etc.—damn fun, with as much energy and joy of filmmaking as an early French New Waver. Digital Surround. (R) 154 min. VHS, priced for rental; LD letterboxed (2.35:1), \$40. Miramax.

TANK GIRL

1995. Lori Petty, Ice-T, Malcolm McDowell; dir. Rachel Talalay. Hollywood steamrolls this beloved comic-strip heroine. DTS Stereo Surround. (R) 106 min. VHS, priced for rental; LD letterboxed (2.35:1), \$35. MGM/UA—Pioneer.

—JK



LABELS FOR LESS

WHEN THINGS GET THIS HOT, MADNESS AND death are seemingly inevitable, and that's just what the coroner has on the table this month. Agatha Christie provides an indecent amount of death by misadventure with Warner's *Thirteen at Dinner*, *Ten Little Indians*, *Murder With Mirrors* (\$20 each), and *Appointment With Death* (\$15). More mayhem comes courtesy Columbia TriStar with *Manhattan Murder Mystery* (\$20) and *Deadly Currents* (\$15), while Paramount coaxes revenge from beyond the grave with *Ghost* (\$15) and Warner lets the bodies pile up with *The First Deadly Sin*, *Body Heat*, *Mike's Murder*, and *Executive Action*



Clay ball: *Ghost's* Moore, Swayze

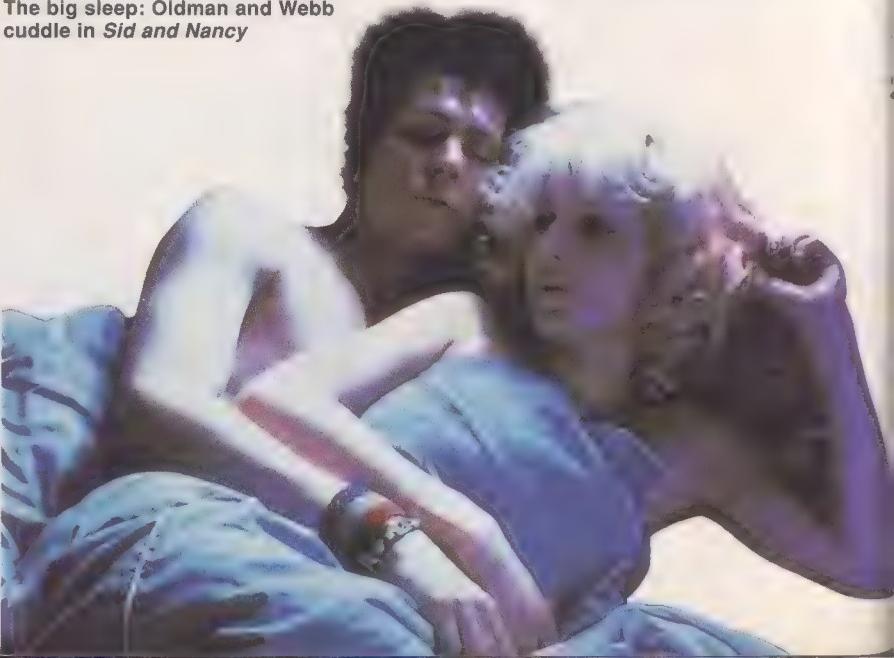
(\$15 each). On to the crazies: They're all lunatics in MCA/Universal's *Phantom of the Opera*, *Nightmare*, and *Paranoiac* (\$15 each); ditto MGM/UA's *Blown Away* (\$20) and Warner's *Nuts*, *Final Analysis*, *Dead Ringer*, and *Klute* (\$15 each)—though, over at Columbia TriStar, madness can be found in the *Eyes of the Beholder* (\$15). Warner proudly champions Alfred Hitchcock's perfectly proportioned mix of madness and death with *Dial M for Murder*, *I Confess*, *Strangers on a Train*, *The Wrong Man*, and *Stage Fright* (\$20 each). Finally, please remember that, even though it seems like doom and destruction abound at every turn, at MCA/Universal, *Where There's Life There's Hope* (\$15). —JK

SID AND NANCY

HOPE I DIE BEFORE I GET OLD." PETE Townshend penned it, Sid Vicious fulfilled it. By OD'ing in February 1979, just a few months after allegedly stabbing his girlfriend Nancy Spungen to death, Sid Vicious—onetime bassist for punk-rock pioneers the Sex Pistols—

instantly joined the ranks of rock's mostly tragic immortals. Thankfully, director Alex Cox avoided romanticizing the story of punk's terrible twosome in his chilling 1986 film, which features Gary Oldman and Chloe Webb in the title roles. Masterfully handled by The Criterion Collection, *Sid and Nancy* (CLV/CAV discs, \$100) is a warts-and-all look at the life (and death) of this seedy, modern-day Romeo and Juliet. Criterion's 1.66:1 transfer, taken from a 35MM interpositive, is a marked improvement over Embassy's cropped 1987 effort. The LD's stereo-surround soundtrack pummels mightily during live performances, but it also uncovers detail, such as the snappy pop-gun crackles in Chapters 19 and 21, and Sid's, er, bright performance of "My Way" that opens Side 2 in Chapter 37 is simply killer. Extras, a Criterion specialty, rule the day, with insightful audio tracks from Oldman and Webb, among others (but not Cox, who declined to participate in this restoration), footage from a naughty and infamous Sex Pistols' British TV interview, and the real Sid and Nancy trying to stay awake and coherent during an interview session for the punk documentary *D.O.A.: A Right of Passage*. And then there's *England's Glory*, a documentary shot during the making of *Sid* in which director Martin Turner, who couldn't get the proper clearance to use Sex Pistols songs in his documentary, substitutes German calliope music instead—a fitting, absurd exclamation point for the

The big sleep: Oldman and Webb cuddle in *Sid and Nancy*



so-called Blank Generation if ever there was one.

—Mike Mettler

THE PROFESSIONAL

MY FAVORITE CHARACTER IN *LA Femme Nikita* (1990), writer/director Luc Besson's trend-setting international action hit, was The Cleaner, the cold-blooded assassin ably portrayed by the magnetic Jean Reno. So imagine my delight when I discovered that Besson's first English language feature, *Leon*, would revolve entirely around the exploits of The Cleaner, now transplanted to New York City. The final result, retitled *The Professional* for its release in the States (Columbia TriStar; VHS, priced for rental, CLV disc \$35), is a smooth, vastly entertaining, and incredibly cool tour de force. Wonderfully supported by newcomer Natalie Portman as a young survivor of a corrupt DEA drug hit, this grungy New Wave cousin to the French Jean-Pierre Melville-Alain Delon collaboration, *Le Samourai* (1967), also owes a debt to John Cassavetes' *Gloria* (1980) at its most conventional and Charlie Chaplin's *The Kid* (1921) at its most bizarre. Thierry Arbogast's glorious 2.35:1 Technovision compositions have been retained on the LD (even though the jacket incorrectly labels the aspect ratio as 1.85:1), and the film brims with vibrant color and panache due to the fine Sony transfer and pressing and TriStar's new mastering process. The powerhouse surround soundtrack, which includes Eric Serra's supple symphonic

score and Sting's "Shape of My Heart," is also a winner. All in all, it's a very *Professional* job.

—MN

**□ JIMMY PAGE AND ROBERT PLANT
No Quarter Unleashed
□ ENCOMIUM
A Tribute to Led Zeppelin**

WHEN GUITARIST JIMMY PAGE AND singer Robert Plant, the principal foils in the highly influential rock band Led Zeppelin, decided to rejoin forces last year, they did so on their own terms, writing new songs and radically rearranging familiar classics. It was wisely done, as *No Quarter Unleashed* (WarnerVision; VHS, \$30, CLV disc, \$40) is a triumphant return to form. Half of the program was shot in a London studio in front of a live audience; the rest was divided between jam sessions backdropped by the lush greenery and exotic rock formations of northern Wales and a pilgrimage to a small village in Morocco. On new material like the rhythmic "City Don't Cry" and "Wah Wah," Page and Plant stretch out on blankets with a group of local Moroccan musicians and play off of each other with obvious relish. The live-in-studio work is largely engrossing, too, as the pair gets augmented by a full band, the London Municipal Orchestra, and/or the Egyptian Ensemble. Among the many transcendent moments are Najma Akhtar's hypnotic vocal counterpoint to Plant on "The Battle of Evermore" and Wael Abu Bakr's joyous violin solo on the show-stopping "Kashmir."

Zeppelin aficionados should also check into *Encomium: A Tribute to Led Zeppelin* (WarnerVision; VHS, \$20, CLV disc, \$30), a 43-minute (not quite the "approx. 50 minutes" that the packaging states) paean to all things Zep. A tie-in to a recent tribute album, *Encomium* is basically a documentary-style Zeppelinfomercial, as performers ranging from Sheryl Crow to Duran Duran genuflect at the grand temple Zeppelin and recall how they keyed into the group's vibe as prepubescents. "I think they're the best band there ever was," growls the grating David Yow, who guests on vocals with Helmet. "It's not music for p-----, is it?" You are correct, sir.

—MM

ROUGH NIGHT IN JERICHO

THIS FORGOTTEN 1967 SAGEBRUSH saga, yanked from Universal's seemingly endless library of immaculately preserved titles, is noteworthy for several reasons, but primarily because of Dean Martin, who plays well against type as a megalomaniacal sadist who runs the small town of Jericho. An extreme handling of a familiar Western theme, *Rough Night in Jericho* (MCA/Universal; CLV disc, \$35) is a first-rate example of how violence inundated late-'60s cinema, as it contains a generous number of graphic hangings, whippings, shootings, stabbings, and mutilations. On a technical level, the disc, pressed by Pioneer/LDC, is a joy to behold, presented in its full 2.35:1 Techniscope splendor with pristine Technicolor images from the masterful paintbox of Lucien Ballard, the film's director of photography. And the theater-quality mono sound accentuates each scream and gunshot, as well as Don Costa's lively score. The key bonus, though, is the theatrical trailer hosted by the amiable Dino we all know and love, who jokingly explains away his *Jericho* role as punishment for not being nice to screenwriters.

—MN

PERSONA

WHEN IT COMES TO INGMAR BERGMAN films, there's only one thing worse than constantly being made aware of the inevitability of death—and that's the constant awareness of *being*. Things are no different in the revered director's amazing *Persona* (1966). When famous actress Elisabeth (Liv Ullmann) realizes that her own life is just another role she's been playing, she trades it all in for the "brilliant role of her apathy" and becomes silent and immobile. Through Elisabeth, Bergman makes a study of how each of us create our own fiction to fill our lives with enough prattle and trivialities to avoid facing the horror of not really knowing why we're here in the first place. MGM/UA's clear, full-screen LD transfer of *Persona* (CAV disc, \$35) does a good job of reproducing the gamut of styles, from documentary to avant-garde, that Bergman uses to consistently distance the audience from the fiction at hand. The monaural

PROGRAM SEARCH

Readers, help readers find these missing links

John Waters' Pink Flamingos
Motel Hell, starring Rory Calhoun
(any format, laserdisc preferable)

Donald L. Davis
201 Knoll Crest Dr.
Birmingham, AL 35209

The Karen Carpenter Story (1989)
Nero Wolfe, starring Robert Conrad,
Lee Horsley (1981; 14 episodes)
(will consider any offer)

Joe Diamond
290 Chubb Rd.
Canonsburg, PA 15317

Dr. Who and Blakes-7 (BBC/PBS)
(looking for fellow fans to swap tapes)

Jeffery Hall
Rt. 4, Box 123
Carmi, IL
JeffSHall@aol.com

Buckstone County Prison (HBO)
Larry Menz
201 S. Walnut
South Elgin, IL 60177

Cricket on the Hearth
Jason Bailey
c/o Bancroft
Rt. 581 Commissioner's Pike
Mullica Hill, NJ 08062

Jaws of Satan, starring Fritz Weaver
(looking for officially distributed copy)
Martie Sample
3501 Loop Rd. E., #A-10
Tuscaloosa, AL 35404

Prince of Foxes and *The Black Rose*,
starring Tyrone Power
Frederick R. Smith
10451 Hickory Ridge Rd.
Columbia, MD 21044

Breaking the Rules, starring
Sam Kinison (HBO)
Sharon Summers
1527 W. Chase, #1C
Chicago, IL 60626

soundtrack is clear enough to accentuate every cry and whisper, and the scope of the B&W visual vocabulary employed by cinematographer Sven Nykvist—which moves from murky, shadow-filled, and sometimes unfocused interiors to harshly sharp, high-contrast, deep-focus exteriors, and the (by now) much imitated face-on-face compositional device—expertly communicates the emotions of the characters. Above all, the wisely chosen CAV presentation is an outstanding forum

BETTER DEALERS SELL BETTER SOUND

If you're in the market for building or upgrading a high performance audio or home theatre system, where you shop may well be the most important decision to make. The big mass merchants usually have the biggest selection and low prices for video. However, if the goal of your audio purchase is maximum sound quality, consider the independent specialty dealers in your area. These are the dealers who, frankly, excel in three important product categories:

Better Loudspeakers. Your system will sound no better than your loudspeakers. The specialty dealers sell the best speakers, generally. They can demonstrate differences that you can easily hear.

Better Electronics. Specialty dealers understand the benefits of better quality amplifiers and digital sources. Again, you can hear the difference!

Cable. High performance cable may well be the most cost effective improvement you can make to a quality audio system.

The higher level of service, expertise, and personal attention is an added bonus. The end result is better sound.

Chris Browder

President of the Academy for the Advancement of High End Audio



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SOFT WIRE SOFT WIRE SOFT WIRE

for studying this masterpiece. *Persona* is very much grata. —JK

THE ADVENTURES OF BARON MUNCHAUSEN

IT'S IMPOSSIBLE!" SHOUTS DIRECTOR/co-writer Terry Gilliam during the tattered bonus featurette that precedes this otherwise gorgeous remastering of his 1989 exercise in phantasmagoria. What Gilliam's referring to is how to do justice to the wild tales of the film's title character, which have captivated people's imaginations for over 400 years. While initially not a great success, this *The Adventures of Baron Munchausen* (Columbia TriStar; CLV/CAV discs, \$40) shows how the movie continues to improve with age. Recounting the attempts of the indefatigable Baron (a bravura performance by John Neville) to save a village from invading Turks, this comic epic takes its cast of characters to the moon (to meet up with Robin Williams in an extended, unbilled cameo), to the kingdoms of gods Vulcan and Venus (Oliver Reed and Uma Thurman, respectively), and into the belly of a monster fish that makes Jaws look like Charlie the Tuna. Look for Jonathan Pryce, Eric Idle, and Sting, among others, in this incredible display of opulent F/X, set design, and art direction—all of it exquisitely lensed by Giuseppe Rotunno and rendered pure by a flawless Sony transfer and pressing in its 1.85:1 theatrical dimensions. The grand stereo surround soundtrack features a sweeping Michael Kamen score, multiple explosions, and enough campy audio effects to satisfy even the staunchest of old-time Warner Bros. cartoon aficionados.

—MN

SANJURO

SANJURO (1962), A MASTERFUL SAMURAI tale from Japanese director Akira Kurosawa, concentrates heavily on character development with short, intense bursts of action in between—a refreshing twist for those numbed by today's feet-first, ask-questions-later action films. Toshiro Mifune, reprising the character he created in *Yojimbo* (1961), is once again utterly convincing as the seedy samurai who'd rather use his brain than his tired old body. *Sanjuro* (The Criterion Collection; CLV

disc, \$50) does tend to drag a bit when Mifune's off the screen, but his absences are thankfully brief. At times, the plotting and counter-plotting of Mifune and his enemies sometimes gets a little reminiscent of the '60s *Batman* TV series, and I must admit to being somewhat immune to Japanese humor (there's just too much damn yelling!), but the spectacle of *Sanjuro* is certainly spectacular, with a 2.35:1 transfer that fills the screen with great horizontal and in-depth composition, all in sharp shades of gray. —JK

THE SINBAD COLLECTION

SOME PEOPLE SAY CASABLANCA OR CITIZEN KANE. I say that *Jason and the Argonauts* is the greatest film ever made," declares Tom Hanks in the nifty supplementary side of *The Sinbad Collection* (Columbia TriStar, CLV/CAV discs, \$100), the LD box set that houses F/X wizard Ray Harryhausen's marvelous *Sinbad* series. (Harryhausen's effects work on 1963's *Argonauts* is generally acknowledged as being revolutionary.) And while the Sony-pressed four-disc *Sinbad* presentation gets an A+ for effort, their execution leaves some room for improvement. Inferior to the now out-of-print Pioneer Special Editions versions, this *Sinbad* trilogy—*The 7th Voyage of Sinbad* (1958), *The Golden Voyage of Sinbad* (1974), and *Sinbad and the Eye of the Tiger* (1977)—is slightly faded and grainy. That's especially frustrating in *7th Voyage*, which benefitted greatly from Wilkie Cooper's eye-popping Technicolor imagery. *Sinbad* does excel on the audio front, however, particularly in terms of the restored Bernard Herrmann stereo-surround score for *7th* and Miklos Rozsa's superb harmonies for *Golden*. Though none of the three films represent the zenith of Harryhausen's feature work, all of them contain some of his best stop-motion magic, an obvious influence on directors like Steven Spielberg and George Lucas. The box also contains Harryhausen-penned liner notes, theatrical trailers, a 1958 preview promo highlighting *7th Voyage*'s perfected Dynamation process, and recent interviews with Harryhausen, producer Charles H. Schneer, and the original *Sinbad* himself, Kerwin Matthews. —MN

"Joe Kane Says Your TV Picture Is All Wrong. And He's Right."

— Video Magazine, October 1994

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*High Fidelity Video is the mix of the art of the cinematographer and the science of reproducing it on a properly calibrated television. Your TV must not make movies brighter, bluer, or in any way different from the artist's vision. ISF trains dealers to calibrate your television on delivery to accurately reproduce the incoming signal. Proper setting of color, tint, contrast, brightness, sharpness and color temperature can be yours if you choose one of these dealers.



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TECHNOLOGY

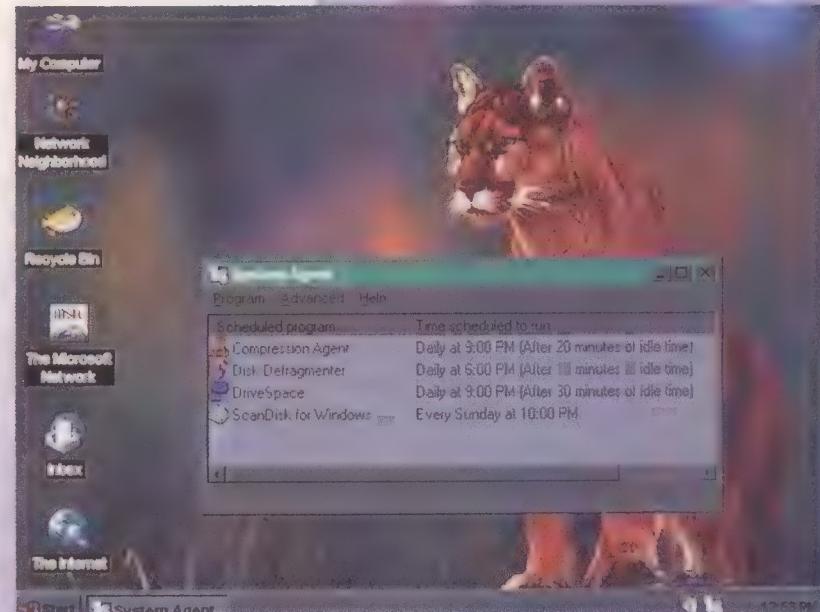
SMOOTH OPERATOR

Everybody's Doing Microsoft's Windows 95

UNLESS YOU'VE BEEN BURIED IN A think tank somewhere working up a plan to overhaul the welfare system, you've probably heard of Microsoft's new *Windows 95* operating system for IBM-compatible PCs. As the heir apparent to the *Windows 3.1* and *MS-DOS* software that have ruled the desktop for the last 5 years, *Windows 95* has become the most anxiously awaited, thoroughly scrutinized, and heavily marketed piece of software in the history of personal computing. And small wonder: It may finally make the PC a viable platform for multimedia, entertainment, and all-purpose home computing. In other words, *Windows 95* may make the PC as flexible and convenient as an Apple Macintosh.

I know because I've been working with pre-release versions of *Windows 95* for several months now, and I must say that I'm impressed. No, it isn't perfect; nothing is. But the improvements offered by this operating system—which manages all of the basic functions of the PC—are so pervasive that *Windows 95* simply can't be ignored. One thing's certain: If you buy a new PC in the next couple of months, you'll probably end up using *Windows 95* (\$249; \$149 as an upgrade to *Windows 3.1*). Virtually every major PC vendor will put it on their systems (after it's released, that is, reportedly on August 24th). For most PC users, in fact, the question isn't whether to use *Windows 95*, but how soon to upgrade.

The operating system itself should do nothing to discourage your interest. If you've worked with a previous version of *Windows*, you'll immediately notice that *Windows 95*'s interface has a new look and feel. There's no evidence of DOS—no scrolling text and no inscrutable C:\ prompt challenging your



Looks and brains: Plus! offers this lion wallpaper and system-agent technology

self-esteem. Instead, you get a desktop that looks suspiciously like a Mac's, with nested folders and lots of icons representing documents and files. The heir to the dread C:\ prompt is the START button, which appears on the bottom-left corner of your screen inside an area called the TASKBAR.

The idea, according to Microsoft, is that the START button gives novices an intuitive place to begin, while veterans can work from here to set up the desktop to meet their needs. And it works. *Windows 3.1* is fraught with confusing icons, but *Windows 95*'s START button makes things easy: Click on it and up comes a list of program groups and applications, which can be selected to open documents and software. The TASKBAR, meanwhile, shows the names of the applications and items you've opened, so you can easily return to one without launching several instances of, say, a word processor.

The upshot is that *Windows 95* is a

very visual operating system—if you can see an item, you can act on it. Double-click on a folder icon on the desktop and you'll see the contents of that folder in a window. Or right-click on

ON THE INSIDE

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the folder and select *Windows 95's Explorer* file-manager utility from a pop-up menu, and you'll see the contents of the folder. You can also create "shortcuts," icons that serve as pointers to actual files and folders and let you access, for example, frequently used items on the desktop. Copying, deleting, and moving files is a simple "drag-and-drop" exercise: Click on the file, move the on-screen cursor to the file's "destination," and release.

If all of this seems confusing, it can be. The relationship of shortcuts to the actual files and folders can get fuzzy, especially for the uninitiated. Poking around in *Windows 95* for a file can turn the desktop into a mess of opened windows—a problem that's compounded when you're also using the Microsoft Network on-line service, which is bundled with the operating system (though you need to subscribe to the Network to use it). Finally, some of the menu choices that pop up when you right-click on an item seem inconsistent—*Windows 95's Quick View* file-viewer utility, for example, appears only for a limited number of file formats.

One note on requirements: Microsoft claims that *Windows 95* runs acceptably on a PC using an Intel 386 CPU with 4 MB of random-access memory (RAM), but I don't buy it. Any system with less than 8 MB of RAM and a chip slower than a 66-MHz 486DX2 will have you grinding your teeth, though a 33-MHz 486 may squeak by. A 75-MHz Pentium CPU and 8 or even 16 MB of RAM will make video and other demanding operations sprint.

When used with an adequately powered system, *Windows 95* offers plenty of multimedia features. It took 3 years and millions of dollars in R&D, but *Windows* finally has a volume control. Double-click the omnipresent speaker icon on the TASKBAR and you get line-level controls for recording and playing .WAV and MIDI files as well as for music CDs spinning in a CD-ROM player.

Speaking of which, *Windows 95* automatically recognizes music CDs, launching a CD player "applet" (mini-application) and playing the disc. Compatible CD-ROM titles get the same treatment. Finally, *Windows 95* has improved MIDI support, so MIDI scores won't suffer dropouts or other problems at crunch time.

What's missing—at least for now—is enhanced video support. Microsoft promises to ship upgrade diskettes for

adding *DirectDraw*, which will enable the system's graphics hardware to expand video clips, so that smaller video files can be zoomed up to fill your screen with acceptable quality. *DirectDraw* will also enable higher frame rates and make it possible to play back MPEG-1 videoclips on Pentium-based

It took 3 years and millions of dollars in R&D, but Windows finally has a volume control.

PCs without dedicated hardware.

Underneath all of these features is some serious engineering. *Windows 95*'s 32-bit architecture lets programs designed for it operate more efficiently than those designed for 16-bit *Windows 3.1*. The new system also provides "preemptive multitasking," which lets your PC intelligently juggle several programs at once. And *Windows 95* supports "multithreading," so you can do things like format and print a long document in the background even as you open another document.

The advanced features seem to work. Crashing *Windows 95* was difficult and, when a program did lock up, I was almost always able to shut down the offending application and continue with other tasks. I also noticed improved performance when running multiple applications. I could even run two videoclips simultaneously without completely destroying image quality.

Windows 95 also offers Plug and Play, a standard that enables the operating system and compliant PCs to set up peripherals automatically, without painful guesswork. Plug and Play requires that add-in cards be built to the standard, but *Windows 95* handles older cards as well. In practice, the system almost always correctly identified cards and CD-ROM players, allocating resources with the wisdom of Solomon.

Finally, *Windows 95* abolishes the old file-name limit of eight characters. Now you can use up to a whopping 255 characters in a name—gibberish like TGUNSPIN.AVI, for example, can be given a relatively clear name like "Top Gun clip showing Maverick's flat-spin.AVI."

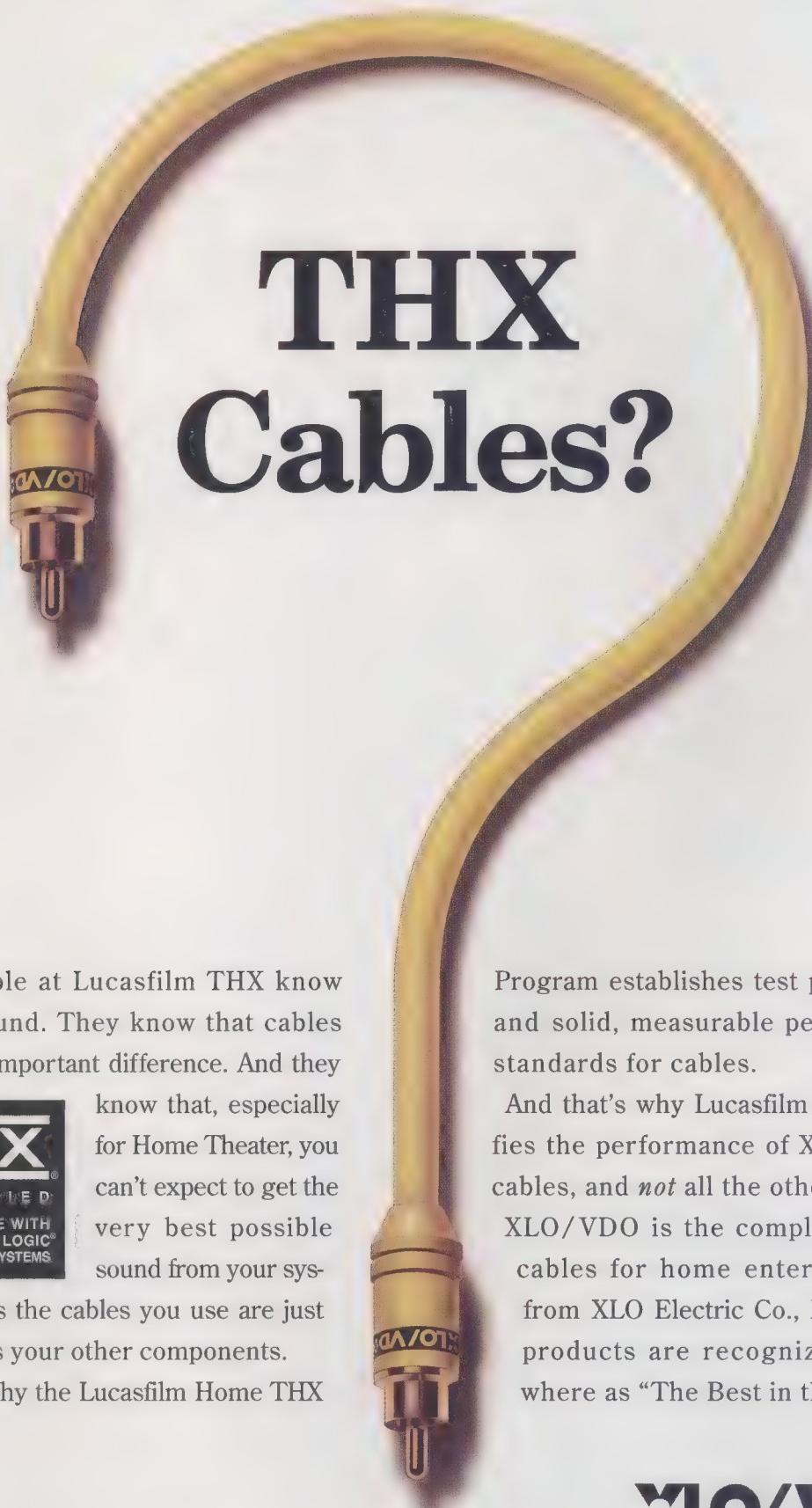
Compatibility was a key goal of *Windows 95*, and Microsoft has managed to achieve it. Microsoft's *Word for Windows*, *Access*, and *Excel* all ran well (they'd better, I suppose). I also had no problems with Lotus' *cc:Mail* and *Organizer*. Multimedia titles ranging from *Wines of the World* to *Dangerous Creatures* all installed and played without a hitch. When I upgraded existing *Windows 3.1* PCs with *Windows 95*, I was able to run previously installed programs right away. *DOS* programs passed muster, too. Few programs need more memory and power than *DOS*-based games, and the ones I played—such as *Doom II* and *SimCity 2000*—ran well. One reason for the smooth ride: *Windows 95* keeps a database of configuration settings for common *DOS* applications.

The record wasn't perfect, though. Installing Traveling Software's *LapLink 5.0*, which hooks computers together by cable or phone line, nuked two different systems. And when I tried to install an MPEG-1 video card, it took almost 2 hours of hacking to get my display back to normal. Power users will need to learn some new tricks when they need to free up memory for a gluttonous app.

And then there are the extras: Running out of space on your hard disk? *Windows 95* throws in a disk-compression program called *DriveSpace*. Want to get onto the Information Superwhatever? The Microsoft Network icon on the desktop will have you online within minutes. There are a kazillion alphabetically challenged network protocols ready and waiting inside the box.

What's missing? *Windows 95* doesn't have a built-in Internet connection—not yet, at least. Microsoft promises to deliver Internet service in their upcoming *Plus!* product, a \$50 add-on that also includes sundry desktop designs, additional network and on-line capabilities, and bug fixes. Microsoft has also promised to release a series of *Tune Up* packs, which will add features and fixes every 3 months or so.

Obviously, *Windows 95* is serious business. It not only adds key features and better stability, it's prompted a sea change in the way PC software works. By year's end, many applications and titles will be available in native *Windows 95* format. Unless something truly unexpected happens, *Windows 95* is destined to change the history of personal computing. —Michael Desmond



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NEW TECH

1 **NEC's** MultiSpin 6X CD-ROM player boasts a speedy 900-KB-per-second data-transfer rate, enabling it to cruise through databases and load images faster than traditional 2x and 4x drives. Available in external (Multi-Spin 6Xe, shown; \$599) and internal (MultiSpin 6Xi, \$499) versions, the player is rated with a 145-millisecond average access time and a 130-ms random seek time. Both versions are compatible with the new CD Plus music-disc format, which accommodates photographs, videos, lyrics, and interviews in addition to music. Supplied software includes SimpleStart, to simplify installation, and CD-Explorer, to simplify drive management after installation and to scan a loaded disc for its data format. **2** **ALTEC LANSING's** AVC1000 desktop-videoconferencing system (\$800) provides videoconferencing over conventional telephone lines; the system handles communication via video, sound, telephony, and the supplied pen tablet. Live or still video images can be transmitted using the 0.33-inch, 410,000-pixel CCD color camera, which is governed by a DSP microcontroller. An integral audio system, including two powered speakers as well as proprietary bass and treble boosts, handles the audio chores. The AVC1000's telephone features include hands-free dialing and a built-in speakerphone. Finally, the AVC1000's pen tablet, based on ACECAD conductive-positioning technology, allows for high-resolution pointing and annotation.

3 **TOSHIBA's** IK-M28 desk-

top video camera (\$259) makes videoconferencing or live frame-grabbing affordable. The M28 is said to deliver superior imaging performance in any application that requires a high-quality NTSC video input. The camera's 0.33-inch color CCD image sensor is rated to yield 350 lines of horizontal resolution, and the unit is said to be compatible with standard plug-in boards for compression, communications, and audio capabilities. Other features include a tilt/swivel base and a privacy lens shutter. Focal adjustments allow for both wide and standard views. **4** **VOYETRA's** Sound Suite for Windows (\$200) is designed to help multimedia PC users boost their audio and video capabilities; the utility software package is said to let you record and edit MIDI music and digital audio, sort and view images and videos, and create custom slide presentations with narration and background music. The package includes Voyetra's Multimedia Productivity Pack (a compilation of 14 programs that provide uniform multimedia management of audio and video), MIDI Orchestrator Plus (a MIDI sequencer with music-notation capabilities), Music Gallery (a catalog of over 400 MIDI songs, as well as 350 non-MIDI tunes, in a variety of styles), and a comprehensive library of graphic and video files. ■

READER SERVICE INFORMATION

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ALTEC LANSING circle 128

TOSHIBA circle 129

VOYETRA circle 130





VIDEO TEST

Double Duty

**Den meets desktop
in Toshiba's TIMM
multimedia television**



WHEN ASKED TO DESCRIBE THE INFORMATION SUPERHIGHWAY, most folks talk about the integration of TV sets, cable-TV service, telephones, the Internet, and computers.

The assumption is that these products and services will one day come together, with programming and other information being delivered to some sort of super TV through a single cable. While that day remains years (if not decades) away, Toshiba has taken a modest step toward "convergence" with their MM20E45

TIMM 20-inch monitor (\$999). The acronym stands for Toshiba Interactive Multimedia Monitor.

The concept is simple: Instead of watching films on one set, playing videogames on another, and doing word processing and other computer work on a third, the TIMM brings it all together. Like a standard 20-inch TV set, it has antenna and A/V input jacks. And like a computer monitor, it has a standard VGA input jack (compatible with IBM PCs and, via an adaptor, with Macintoshes).

It should be noted that this isn't the first time a computer monitor and a TV set have been combined into a single unit. Sony's Profeel TVs of the early 1980s (before the standard color VGA jack had become commonplace) were

combo units, and most of today's high-end projection systems also have inputs for high-resolution computer graphics (though such projection systems cost \$5,000 and up).

Despite the advanced capabilities it offers, the TIMM's operating controls are surprisingly simple. The set, which measures 24.12 x 26.75 x 21.6 inches (h/w/d), has an elegant look, with just six small pushbuttons below the screen (for menu navigation as well as volume and channel control) and two larger buttons for power and operating mode (RGB/TV/VIDEO). A single red power light is the only indicator—everything else is communicated on-screen.

The 29-button remote is clearly laid out and intuitive to use. Most of the basic TV creature comforts are here, in-

cluding a sleep timer, cable tuning, channel lockout, MTS/SAP audio, and closed captioning.

As mentioned, the TIMM has a 20-inch screen, the way consumer TV sets are measured (diagonally across the actual picture area). Using the computer industry's inflated standard (which includes the masked-off portion of the tube), the TIMM is a 21-incher; with a real computer image on-screen, the actual diagonal measured 19.5 inches. Aspect ratio is 4:3.

The TIMM seemed too close to my face when I propped it on my desk for computer work, so I compromised and placed it behind my desk—about 4 feet away from my sitting position. Though this is twice the distance I use with my everyday monitor, the TIMM still occupied roughly the same field of view, and I could comfortably use word-processing software and other computer applications. Signals were routed in through the set's 15-pin RGB input.

I noted that images on the TIMM weren't quite as sharp as those displayed on my everyday monitor, which is capable of very high-resolution graphics. For computer use, the TIMM's resolution is limited to stan-



BY CLIFF ROTH

dard VGA—640 x 480 pixels (with up to 16.7 million colors). Clearly, this is the TIMM's biggest limitation, since even smaller computer monitors generally do better. But for playing videogames, watching CD-ROMs, and running most Windows applications, 640 x 480 is fine.

For hooking up videogame consoles, VCRs, laserdisc players, or any other video device, the TIMM provides just a single set of A/V line-level input jacks (including an S-Video connector). Considering the TIMM's professed desire to become the nerve center of the home information revolution, the lack of extra video inputs, and front-panel input jacks, was a disappointment. The TIMM does provide a pair of audio-input jacks, however, for hookup to a Sound Blaster-type sound card, as well as a pair of variable-level audio-output jacks, for hookup to an external audio receiver, amplifier, surround-sound decoder, or subwoofer.

The TIMM also makes a very good 20-inch TV set. Over-the-air reception was reasonably sensitive, with excellent ghost rejection. Watching the crosshatch test pattern from the *A Video Standard* laserdisc, I saw practically no geometric distortion even at the extreme edges of the screen, though there was a bit of color misconvergence along the very top (it wasn't objectionable when viewing TV and movies).

As shipped from the factory, the screen's color temperature was 9,300 degrees Kelvin on the video input, with a very high footlambert reading of 93.5. This made pictures look very

blue and bright. In the RGB mode, the temperature was 9,200 degrees Kelvin with 63 footlamberts (computer standards call for a temperature of 5,400 degrees Kelvin).

Kevin Miller, a VIDEO contributor and professional calibrator, recalibrated the screen to the recommended 6,500 degrees Kelvin for TV/video operation and 5,400 degrees for computer applications. The calibration process revealed a well controlled power supply and a well delineated gray scale at high and low output levels. We also brought CONTRAST down from its maximum to a three-quarters setting, which enabled the set to produce a more appropriate 28 footlamberts. The BRIGHTNESS control was set to just below its midpoint, COLOR was moved to just above its midpoint, TINT remained halfway, and we dropped SHARPNESS to just below the one-quarter mark. At these settings, the picture was accurate and very, very pleasing.

The TIMM's color-decoding circuitry was working reasonably well, and picture-noise measurements were very good. Horizontal resolution in the video mode measured about 480 lines.

On the audio side, I cranked up the volume while watching the *Bob Dylan MTV Unplugged* concert and found that the TIMM—which has a 5-watt-rated amp and two 3 x 4.66-inch speakers—has extremely good sound for a 20-inch stereo TV. Tone, balance, and bass boost are remote-controllable.

In terms of value, the TIMM certainly offers a clear savings in desktop real estate, but cost savings are harder to gauge. A 20-inch color TV with stereo

BY THE NUMBERS

Measurements by Berger-Braithwaite Labs

Horizontal resolution: 480 lines

Picture S/N: video, 53.7 dB; chroma AM, 63.5 dB; chroma PM, 64.1 dB

Screen brightness: video, 93.5 footlamberts before calibration, 28.1 footlamberts after calibration; RGB, 63 footlamberts before calibration, 28.1 footlamberts after calibration

Color temperature: video, 9,300 degrees K before calibration, 6,500 degrees K after calibration; RGB, 9,200 degrees K before calibration, 5,400 degrees K after calibration

sound sets you back about \$300 these days. But on the computer-monitor side of the equation, there's really nothing to compare the TIMM to—no one makes a 21-inch monitor with such limited resolution. (Even 14- and 15-inch monitors routinely offer at least SVGA 800 x 600 and 1024 x 768 resolution.) Just about all 21-inches offer resolution of 1280 x 1024 or higher... though their price tags run over \$2,000. And a small 13- or 14-inch VGA monitor costs about \$200....

In any case, Toshiba deserves credit for designing—and releasing—the TIMM. In a world flooded with look-alike TV sets and computer monitors, the TIMM truly offers something different. While its inability to display high-resolution graphics limits its suitability for serious computer applications, it does a fine job with regular TV viewing, videogames, and CD-ROMs.

Its 20-inch screen size will keep it out of most home-theater systems, of course, but it's ideal for use in bedrooms, home offices, dens, and college dorm rooms. The college dorm is the perfect spot, really—space is tight, and a combo TV/computer monitor would be ideal. The only thing that's really missing, for dorm-room use, is a headphone jack.

Toshiba has indicated the MM20E45 will be followed by TIMMs with other screen sizes and capabilities. My suggestion to the manufacturer is that they should build in the ability to accommodate cross-operations—allowing you to watch TV in a PIP box while working with a computer display, for example, or to listen to TV while using the computer screen. When you get down to it, the synergistic possibilities are endless. The MM20E45 marks the beginning of some very interesting product development.

THE SHORT FORM

TOSHIBA MM20E45 TIMM

Component type: 20-inch multimedia TV

Price: \$999

Target: Multitaskers

Minimum requirements*: Personal computer, cable or TV antenna

KEY FEATURES

- 20-inch NTSC monitor ■ Standard VGA computer monitor
- FST Black picture tube ■ 181-channel TV tuner ■ Closed captioning ■ Composite, S-Video, and RGB inputs ■ Remote control
- 10-watt audio system

SUMMARY

- A clear savings in desktop real estate ■ Ideal for home offices, dorm rooms, and dens ■ Not suitable for serious computer applications ■ Great for TV viewing, videogames, and CD-ROMs

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SOFTWIRE

PUPPET MOTEL

Laurie Anderson has long been an intensely creative force in music and performance art, and she's been incorporating interactive elements into her multimedia work for over 15 years. She's practically had to tread water waiting for CD-ROM technology to mature to her satisfaction so she could jump in and make her mark. And Anderson doesn't disappoint with *Puppet Motel* (\$40), her Voyager debut. It's quite a revolutionary experience. Click around and Anderson will relate a story about her attempts at making tortillas with an ancient Mexican tribe—only to have the tortillas thrown to the dogs. You'll see part of a riveting live performance, get to play some of her extraordinary and offbeat violins, scan



City vérité: Anderson in *Puppet Motel*

through a mind-boggling journey illustrated by still images, and splice sound and film together in an editing room. Even the cursor image becomes a key element in the proceedings—depending on the scene, it may turn into a motorcycle, a clown, or even a torch that illuminates the writing on the wall (literally). In each “scene,” the cursor moves within the three dimensions of the image, changing in size in relation to the perspective. *Puppet Motel* also lets you send faxes, leave audio messages on the Internet, surf the World Wide Web, and download QuickTime updates, which you can incorporate into the program (all via a fax/modem). And there's plenty more, but you're on your own from here. We'll make sure they leave the light on for you. (Mac disc) —*Josef Krebs*

THE ULTIMATE FRANK LLOYD WRIGHT: AMERICA'S ARCHITECT

AMERICAN ARCHITECT FRANK LLOYD Wright (1867–1959) built some of our nation's most gracious homes and public buildings (such as New York City's Guggenheim Museum), and his contributions have forever changed the perception of “architect as cold technician” to a more positive identity as artisan (or even philosopher). Wright is also responsible for what's commonly referred to as “modern architecture,” of course, a design concept that many find to be bloodless in its approach. Now his designs, both good and bad, are on display in Microsoft's *The Ultimate Frank Lloyd Wright: America's Architect* (\$60). The program takes you on a guided room-by-room tour of three of Wright's best known (and, it should be noted, least conventional) buildings, walks you through his life, piles up 360 of his most influential architectural works for reference, and culls historical information from no less than seven biographies. If that isn't enough, you can also design your own buildings in glorious 3-D by utilizing Wright-styled modules.

The best part of this CD-ROM, perhaps, is how it gets you thinking about Wright's effect on your own life and perceptions about where you live. For example, I grew up in two kinds of homes—one a standard ranch house, the other Victorian—and while I can appreciate the utilitarian simplicity of the former, the latter always felt more like “home” to me. Ultimately, *Ultimate* constructs a well balanced picture that thoroughly illustrates the scope of Wright's genius. (Windows disc) —*Pete Hisey*

CYBERIA

LIKE SOME BASTARD SON OF SHOCKWAVE and *Dark Forces*, Interplay's *Cyberia* (\$40) shoves you into the post-apocalyptic world of 2027, where something sinister is afoot beneath the frozen tundra. Briefly, you're Zak Kingston, a renegade hacker who's been sprung from prison by William Devlin, head of the Free World Alliance, to investigate the mysterious goings on at the Cyberia station and attempt to foil the plans of FWA's

opposition, the Cartels. (It's either that or you go back to jail.) Along the way, you're called upon to attack numerous targets, defend yourself against enemy onslaughts, and, if you make it to Cyberia, solve a series of cagey puzzles. Levels of difficulty can be adjusted for both the arcade-style fighting sequences and for the puzzle levels, and it's safe to say that even hotshot gamers will get more hours of engaging gameplay by setting both levels to HARD.

There are a few drawbacks, such as the fact that Zak can only move along a preset course, which is a particularly stiff way to play an action game; it also makes any attempt at examining your surroundings unnecessarily difficult. Overall, though, *Cyberia* delivers a terrific albeit mysterious storyline (to be honest, I still don't know how it ends), subtle gameplaying options (hint: blasting your way out of a tight spot just won't cut it), and a certain visual flair. (MPC disc) —*PH*

SMITHSONIAN'S AMERICA

WHEN YOU TRAVEL ABROAD, IT'S natural to act like a sponge and soak up all manner of history and culture—but many Americans have never explored the culture in their own backyard. So Creative Multimedia's *Smithsonian's America* (\$30) steps into the breach, letting users be tourists in their own country. Based on an exhibition from Japan's 1994 American Festival, *Smithsonian* comprises a series of interactive photo essays that take you to galleries full of stills, artifacts, songs, and QuickTime movies. The photos range from historical documentation (such as Civil War and anti-Vietnam War protests) to pictures of contemporary average Joes. A wealth of QuickTime clips shows everything from a KKK rally to a wartime fashion show. Popular and historical songs are performed by the likes of Pete Seeger and Scott Joplin. You can also access significant artwork, such as J.B. Stearns' painting of the signing of the Constitution, or call up Dorothy's ruby slippers from *The Wizard of Oz*. How apropos, since *Smithsonian* shows that there's no place like home. (Mac and Windows discs) —*JK*

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HEAVEN SENT

CONTINUED FROM PAGE 27

Beside providing a path for the satellite signal, the RG-6 cable also enables the receiver to power the LNB. Using RG-6 cable is a must, by the way, since its rated 50-ohm impedance protects against signal loss (standard RG-59 video coax, by comparison, is rated at 75 ohms). The system comes without cable, but it's available from Sony (in that \$80 ANJ-DS1 install kit or separately) or from your local Radio Shack or electronics supply store.

The SAN-18D1 dish comes complete with mounting hardware, and the installation process is fairly straightforward. Antenna location, of course, is absolutely critical—first and foremost, that clear southern exposure is needed. Using a compass, I spotted the approximate azimuth of the three DSS satellites, all of which orbit very close to one another in space. After determining that a concrete block wall on my property provided a clear view of that position, I drilled a few holes in the wall, attached the mounting base, used a carpenter's level to vertically align the mounting mast, and tightened it with the supplied nuts.

Once the base was up, I screwed the LNB support arm to the dish and slid the pre-assembled bracket that holds the dish over the mounting mast. I used the compass to again find the approximate azimuth bearing and rotated the dish to that setting, leaving it free to turn. I similarly tilted the dish upward to the approximate elevation, using the hash marks scribed on the mounting bracket; again, I left the nuts loose. I connected the RG-6 cable to the LNB, slid a weatherboot over the connection, and ran the cable to the grounding block, completing the connection to the receiver inside. Finally, I grounded both the satellite dish and the grounding block to a ground rod.

The next step was to tune the antenna. I began by gently sweeping the dish across the sky, generally staying within the correct azimuth and elevation. As promised, the LNB's SignalSeeker LED flashed slowly at first, then flashed faster when the signal locked. Because my TV was visible through a window, it was easy for me to also follow the on-screen signal-strength meter, which, as noted, allows some additional fine-tun-

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ing. With the signal locked and strong (it read about 85 on Sony's scale) and all of the nuts and bolts tightened, the installation was complete. In total, it took about 2 hours, including some Miller time.

DV GUIDE

Typically, the next step for a new DSS owner would be to call a service provider—either DirecTV or USSB (or both)—and request that their unit be activated. After just a few minutes, the satellite would download a signal, and you'd be ready to rock. In this case, my review unit was already unlocked for DirecTV services, so I was ready to surf.

I settled into my comfy chair, remote in one hand, Doritos in the other. The first thing I noticed is the large number of channels—combined, DirecTV and USSB provide more than 175 of 'em. The second thing I noticed is that it's a pain to step through all of them. Fortunately, the SAS-AD1's on-screen display, called the Express Navigator, alleviates much of the tedium.

Controlled by an onboard 32-bit microprocessor, the Navigator displays programming information on-screen via a wide range of menu options, and, more important, allows a degree of menu customization. The Master Menu displays all programming currently being broadcast; each screen or "page" shows on-air and upcoming programs for seven channels over a 90-minute period, with program information displayed for the highlighted channel. A vertical indicator bar shows where you are in this menu. The remote's trackball and CHANNEL/PAGE buttons are used to move from channel to channel, across time, or from one page to the next.

Several options let you select programs by other criteria. The Station Index, for example, displays 21 channel logos. Using the cursor, you can click on one—tuning, say, the Disney Channel—without knowing its channel number. The Station Index can also be set up with seven favorite stations, which creates a Favorite Station Guide. Up to three different Favorite Station Guides can be created—for you and two other family members, for example, or simply to segment the 21 stations you watch most often. The Select Guide lets you examine subsets of the Master Menu by theme, including movies, sports, news, and so on. In some cases, there are subcategories within the subsets—with the movie category, for

example, you'll find action/adventure, children, comedy, horror, and so on. Subset channels can be displayed by channel number or alphabetically by program title.

Custom Guide lets you delete rarely viewed channels from your surfing routine—with 175 channels to choose from, there are likely to be quite a few of them (I, for example, wasn't fond of the heavy sarcasm of The Yarn Channel). Other guides let you select, cancel, preview, or check past purchases on the PPV channels, list special promotions or PPV events, read messages from the program providers, set the channel-lock feature and spending limits, run system diagnostics, select data services (not active at this time), and select different program languages (when they're available).

Conveniences: The system displays a thin strip of the currently tuned channel's picture behind the menus, and its soundtrack also remains active. And channel logos are displayed momentarily in the screen's upper-right corner when you're switching channels.

Despite its complexity, I liked the Navigator: It's fast, flexible, and very intuitive, and its many features greatly expedite the chore of channel surfing. I did find a few quirks, though. When a station menu is displayed, channel numbers are listed in ascending order from top to bottom—980 is above 981, for example—and the "up" cursor carries you up the list to *lower* channel numbers. When cruising through channels with the channel buttons, however, the "up" channel button carries you to higher channel numbers. In addition, there's a fairly long pause when switching from one channel to another; though this limitation may be inherent in an MPEG system, a technological fix here would be much appreciated by us compulsive surfers.

GREAT PERFORMANCES

Ultimately, what you see and hear is a function of the program provider. I used DirecTV programming for this review, and was very impressed by their Total Choice package (\$30 a month). Picture quality was very good, though picture artifacts did present themselves from time to time. Like all DSS receivers, the SAT-A1 contains an MPEG-2 chipset. This means that the receiver is capable of decoding programs with MPEG-1, so-called MPEG-1½, and MPEG-2 coding. The MPEG-1 standard was used

exclusively when the DSS format was launched in 1994. The MPEG-1½ "standard," which isn't a true standard but an upgrade of MPEG-1 that doesn't quite meet the MPEG-2 standard, has been phased in over the last few months. And MPEG-2 is scheduled to debut this fall. [For more on MPEG coding, see "Digital Reality," page 18.]

The improvements granted by MPEG-1½ are clearly visible to the naked eye—or, to be more precise, the artifacts we see with MPEG-1 begin to disappear with MPEG-1½. The upgrade, for example, provides crisp color without edginess around images. And the "blocking" artifacts I noticed last summer, when the MPEG-1 encoding process was still new, are greatly reduced if not altogether banished—with 1994-vintage MPEG-1, I sometimes noticed checkerboard patterns in scenes that were characterized by subtle variations in luminance. Straight MPEG-1 also had trouble handling scenes with fast-moving images as well as abrupt scene changes, particularly when there were sudden changes in luminance; the result was *serious* blocking. But MPEG-1½ handles these types of scenes much, much better.

Is DSS's picture perfect? No. I was able to observe flaws when I was really watching for them, but even then they were relatively minor. The majority of viewers won't notice them. Videophiles are likely to notice them, and some 'philes may find them distracting. As mentioned, however, better encoding is a work in progress. If MPEG-2's improvements leap as far ahead of MPEG-1½ as it leaped ahead of MPEG-1, artifacts may virtually disappear. Bottom line: DSS blows away most cable signals I've seen, though the artifacts that are still present with MPEG-1½ place it a notch below the laserdisc.

The system also did a very good job with audio. Many people are startled the first time they enjoy a DSS movie because the sound is so vastly superior to what they'd been getting with broadcast and cable TV (not to mention movie theaters). Given the topnotch signal, there's no question that a DSS system demands a full-fledged home-theater system to do the format justice.

That doesn't mean the signal is always great, or that there isn't a downside to high-resolution video and audio playback. While DirecTV and USSB maintain a quality-in, quality-out philosophy, the input quality is sometimes

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lacking, and that's not always something DirecTV or USSB can control. The audio quality of the Music Choice channels, for example, falls short of CD quality. With video programs, flaws inherent in the program may be obscured if you view it on videotape, but they can be painfully obvious with DSS; laserdisc aficionados will understand exactly what I mean.

Signal reliability is another important consideration. DSS birds broadcast signals in the Ku band (from 12.2 to 12.7 GHz), where rain and snow can degrade the received signal. The signal can get so degraded (by heavy storms, for example) that it introduces artifacts in the picture or causes it to drop out altogether. At my home in Miami (admittedly at the edge of the DSS satellites' "footprint," though that hasn't stopped anyone from selling DSS hardware or service to South Floridians), subtropical rains provided a stiff challenge to DSS reception. Still, Sony's system was generally able to cope. At first, my signal was marred by picture artifacts during minor storms. So I ran through the dish-alignment drill a second time. I was able to increase signal strength to the high 80s on the relative scale, and these errors disappeared. (Note that a minor change in signal strength probably won't have a direct effect on picture quality once the signal is locked. DSS programming is subject to a "cliff effect." It's either all on or, when the signal drops below the minimum requirement—which might be as low as 40 or 50 on the relative scale—all off. My careful tweaking enabled the system to absorb a little more weather-related signal loss and still maintain picture lock.) Thereafter, the SAS-AD1 was quite robust, and it only briefly lost signal during a particularly nasty thunderstorm. In short, a proper installation and careful alignment helped the system stand tall in the face of all but the worst Mother Nature threw at it.

I'LL REPEAT WHAT I SAID AT THE OUTSET: DSS is the most exciting home-entertainment technology to come down the pike since the compact disc. RCA has scored big with DSS, and Sony deserves to as well. The SAS-AD1 has clearly pushed the DSS envelope, providing some truly useful features we haven't seen before. Thomson will be announcing their second-generation DSS systems in a month or two and, by mid-1996, new DSS licensees Hughes

Network Systems, Toshiba, and Uniden are expected to unleash models of their own. We're clearly in for some exciting action. Today, though, Sony and Thomson rule the DSS roost. And Sony, with the SAS-AD1, has the most sophisticated DSS system going. ■

SURROUNDED

CONTINUED FROM PAGE 39

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Audiophiles who've evaluated early EAD prototypes have questioned whether AC-3 is truly "transparent" compared with the digital audio of LDs and CDs. I feel it's far too early to make such judgments; with a first-generation (if esoteric) decoder and only a small number of titles available, the field is far too limited to draw conclusions. This is especially true because you simply can't judge by switching from AC-3 to DPL—remember, they use different mixes. While there were a couple of moments during my evaluations where the AC-3 sound was a bit "funny" (particularly, a blaring siren in *True Lies*), these were much more likely to have been soundtrack-related. In any event, the music on all three LDs sounded fine to me, as movie-soundtrack music goes.

IN THE END, AC-3 IS A TERRIFIC DEVELOPMENT. Its surround tricks are amazing, its dialogue is crisp and clear, and its bass channel is especially robust. I think that the format's biggest virtue won't prove to be whiz-bang surround effects or ever-more-powerful bass rumbles, though these embellishments will certainly be with us in great quantity and to great effect. Instead, AC-3 should do for movies what the compact disc did for music. That is, AC-3 will engender a gradual re-thinking of production standards and practices, taking the medium of home-theater sound to a higher plane. While we've yet to examine relatively affordable AC-3 gear or plumb the technology's full depths, you can set aside all of the hype: AC-3 is the real deal. ■

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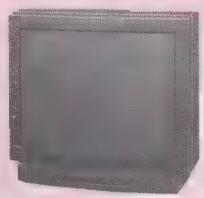
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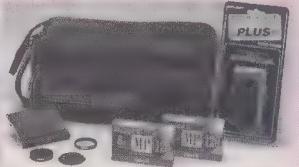
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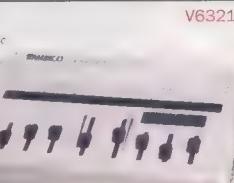
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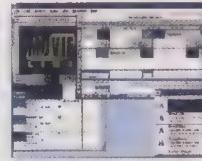
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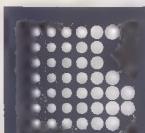
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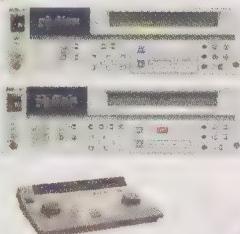
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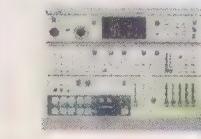
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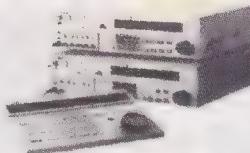
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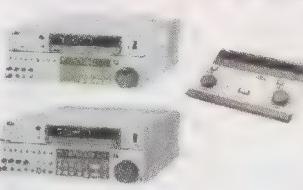
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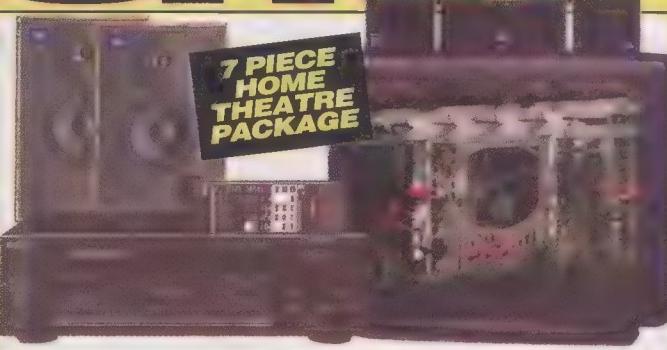
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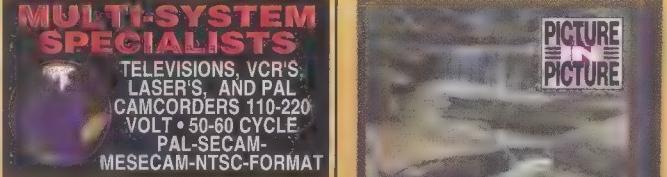
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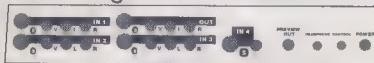
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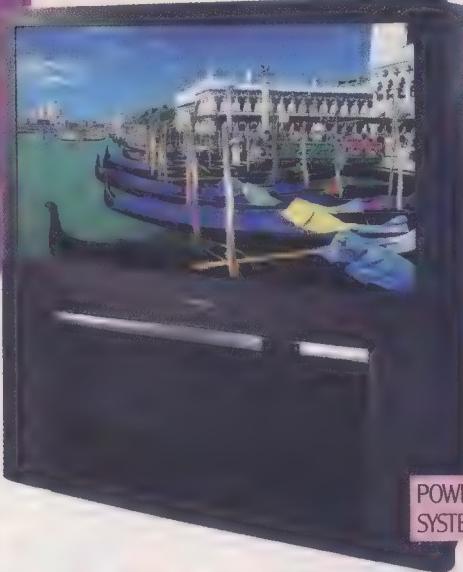
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 20"-25" 25"-27" 27"-32" 35"+
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 0-2 3-5 6-10
- How far in advance do you plan your TV viewing?
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- Do you tape "series" programming (i.e. soap operas, mini-series)?
 Yes No
- Which sources do you use to plan TV viewing?
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- How many programs do you tape per week?
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- Do you tape "series" programming (i.e. soap operas, mini-series)?
 Yes No
- Which sources do you use to plan TV viewing?
 Daily Newspaper Cable Guide Weekly Newspaper Insert
 TV Guide Other
- How many programs do you tape per week?
 1-5 5-7 7+
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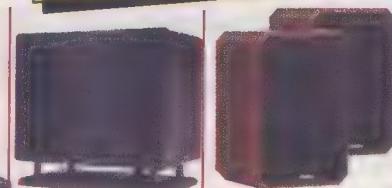
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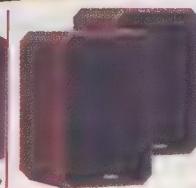


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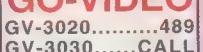
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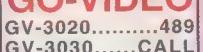
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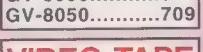
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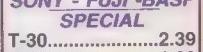
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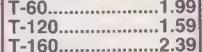
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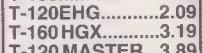
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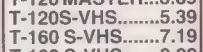
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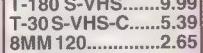
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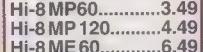
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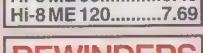
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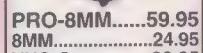
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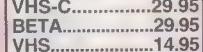
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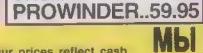
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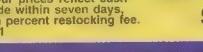
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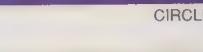
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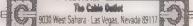
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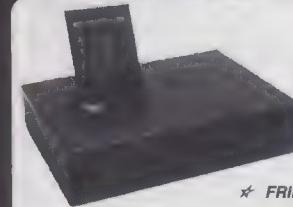


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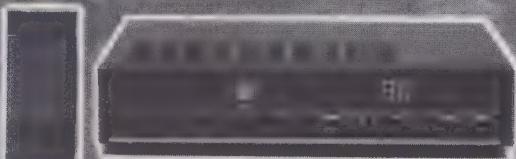


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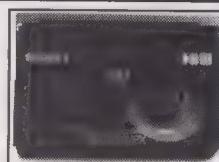
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Interactive TV has many obstacles to leap

TWO-WAY FEAT

THERE'S A CLASSIC SCENE IN *SEINFELD* IN WHICH JERRY AND George are pitching their idea for a new TV series—a "show about nothing"—to a bigwig network executive. "If the show is about nothing," the executive asks incredulously, "why would people watch?" George comes back with the definitive answer: "Because it's on TV!"

That's the fundamental relationship most of us have with television: The reason we watch any given TV program is because it's there—and it happens to be preferable to the other stuff showing in the same time slot.

The collection of technologies known as interactive television plans to turn that 50-year-old bargain between programmer and viewer on its head. Instead of sitting down on the couch and asking, "What's on?" we'll be faced with the daunting question, "What do I want to be on?"

Having toured several interactive-TV test markets, I've concluded that it isn't going to work—at least not as currently devised. Besides calling on people to think too much (that usually isn't a priority when we switch on network or cable TV), the companies getting into interactive TV assume that people will want to use it to save time—to pay bills quicker, get financial information, and buy everything from groceries to mutual funds and draperies. But television historically has been a time-wasting device. It'll never be a productivity tool akin to the personal computer—because most people don't want it to be.

Shopping for food with ShopperVision, a new feature being tested in the Orlando area by Time Warner Cable, seems useless. The service lets you ring up purchases for same-day delivery, but you don't learn much from a simulation that lets you squeeze virtual melons. It isn't much fun, either, with none of the honest engagement or simple titillation that keeps us glued to the tube. The cold, hard truth is that people watch television for entertainment, first and foremost.

The interactive applications that enhance this experience, such as "you're-the-contestant" game shows and action videogames you can play against subscribers in other homes, may fare the best. GTE Corp. has learned this lesson the hard way. After 10 years of developing and testing education, information, and time-saving features on their



mainStreet interactive-TV system, the telecommunications giant has found that people like games the best.

The only problem for GTE is that it isn't profitable. The company charges only \$9.95 a month to subscribe to mainStreet, and company executives say this figure won't enable them to make a profit on the service. Likewise, the business models of other companies getting into interactive TV don't add up. Time Warner as well as Microsoft, in a Seattle-area test with cable giant TCI, want consumers to pay an extra \$50 a month for customized news programs, graphical program guides, and movies-on-demand. But customers may balk at this figure, and company officials admit that it still won't be enough for them to break even on their investment anytime soon.

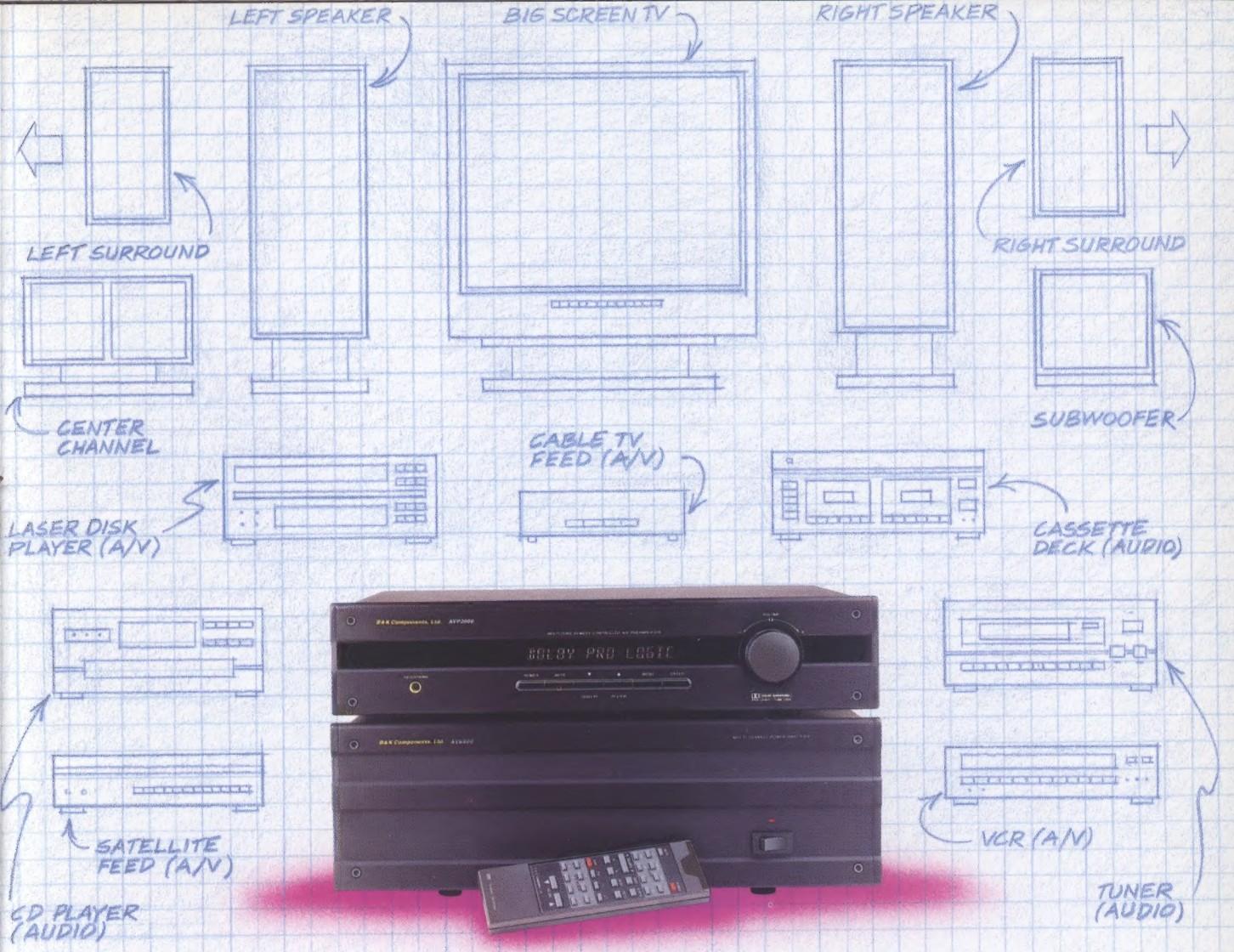
Enter the notion of interactive advertising. The idea is for central computers to gather demographic and viewing information about subscribers; the resulting data would be sold to marketers, defraying the cost of programming. In Northern Virginia, for instance, Bell Atlantic plans to test whether people will use their remotes to call up additional

information on products specifically targeted at them. You, the viewer, would answer multiple-choice questions about your use of everything from detergent to life insurance. In return, you'd get programming discounts—but will you want to give computers private information about your family just to chop a buck off the cost of watching *The Brady Bunch Movie*?

The biggest roadblock on the info highway, perhaps, lies in the fact that the different networks under test are incompatible. If the companies don't adhere to standards and link their networks, they'll have a tough time attracting the huge quantity of content needed to keep customers from getting bored with the systems. Only totally "open" technology will succeed—a goal that probably won't be achieved until a few large interactive-TV systems crash and burn due to insufficient customer use.

One thing seems certain: We won't revel in interactive TV simply, as George exhorted on *Seinfeld*, "because it's on TV!" As the network executive replied, "Not yet it isn't."

—Evan I. Schwartz



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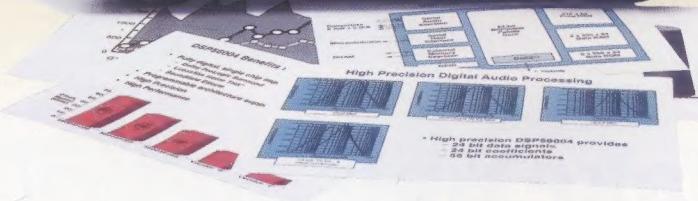
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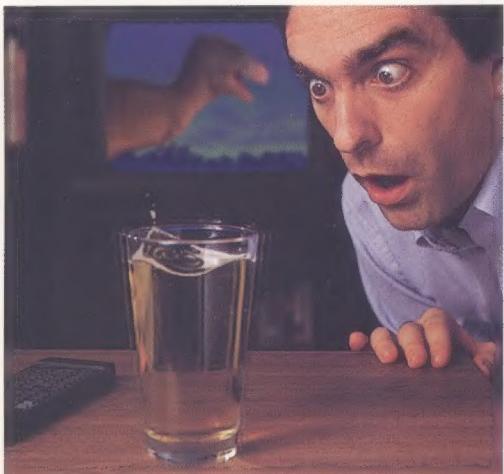


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